U.S. Fire Administration
Working for a fire-safe America

Review and Assessment of Data Quality in the National Fire Incident Reporting System

National Fire Data Center
May 2017

FEMA

Mission Statement

We provide national leadership to foster a solid foundation for our fire and emergency services stakeholders in prevention, preparedness and response.

U.S. Fire Administration

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[1]This publication was originally submitted to the Office of Management and Budget in September 2014 and approved in February 2016 as per the requirements of the Paperwork Reduction Act of 1995.

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Introduction

Federal agencies conduct or sponsor a wide variety of information collections to gather data from businesses, individuals, schools, hospitals, and state, local and tribal governments. Information collections that employ surveys are frequently used for general-purpose statistics, as well as for program evaluations or research studies that answer more specific research questions. Data collected by federal agencies are widely used to make informed decisions and to provide necessary information for policymakers and planners. The collection of this information can take many forms and is accomplished in a variety of ways.

The Paperwork Reduction Act of 1995 (PRA) requires agencies to submit requests to collect information from the public to the Office of Management and Budget (OMB) for approval. These requests, variously known as Information Collection Requests, PRA submissions, or "OMB clearance packages," are required for any survey used for general purpose statistics, program evaluations or research studies. The purpose of the PRA is to ensure that the public is not overburdened by the federal data collection. In a given period, the OMB may focus on the design, methodology and practical utility of data to the federal government and other issues. In 2013, the OMB requested that the U.S. Fire Administration (USFA) assess and document the quality of the information from the National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association (NFPA) and make it more accessible and useable for NFIRS users. This document was originally completed and submitted to the OMB in September 2014 to fulfill the aforementioned request.

Although NFIRS is by design a voluntary incident reporting system, and not a survey, the OMB considers the system to fall under the PRA. In the past, the OMB has questioned why the NFIRS is a voluntary census of incidents for all departments rather than a statistical sample. The USFA has investigated the possibility of sampling and the issues surrounding it. While there are certain advantages to a statistical sampling methodology, the USFA has not undertaken a sampling approach to fire incident reporting for several reasons. First and foremost, Public Law 93-498, the Federal Fire Prevention and Control Act of 1974, directed the then newly created USFA to develop a standardized incident data reporting method and to assist local and state agencies in reporting incident data to this system.[2] Because the NFIRS is used at the local, state and federal levels, abandoning it for a statistical sampling method would adversely impact state and local fire department incident reporting and the NFIRS standard, which is also used internationally. Additionally, much of the cost burden of the current NFIRS reporting is carried by the state in conducting NFIRS operations. The USFA has relied heavily on states as cooperative partners in bearing the costs and resources of maintaining the system, and the states have relied on the USFA to shoulder the development costs. Switching to a sampling method would mean the USFA would need to acquire additional funding and personnel to design and maintain a new sampling system, leaving the state and local entities to wholly cover the cost of an incident reporting system.

[2]http://uscode.house.gov/view.xhtml?req=%28%22national+fire+data+center%22%29&f=treesort&fq=true&num=1&hl=true&edition=prelim&granuleId=USC-prelim-title15-section2208

In addition to completing two separate studies showing that there is no evident systematic nonresponse bias to the NFIRS system, under the PRA process, the USFA has also made good progress working with our state and local partners in addressing previous OMB PRA terms of clearance instructions to increase the use of the voluntary NFIRS system:

> "The agency is instructed to continue efforts to improve response rates to NFIRS. The agency should also investigate the possibility of using additional studies to determine what characteristics of a fire department might make it less willing to participate in NFIRS and determine whether there is a systematic nonresponse bias to the system that should be disclosed in the published reports based on this system" (2003).
>
> "The agency is instructed to continue efforts to increase the utilization of NFIRS. The agency must provide a report to OMB on the bias in NFIRS due to nonresponse. This report is a condition of future OMB approvals" (2006).
>
> "The agency is instructed to continue efforts to increase the utilization of NFIRS. The agency must provide a report to OMB on the bias in NFIRS due to nonresponse. This report is a condition of future OMB approvals" (2009).

The current terms of clearance require that:

> "… FEMA will engage in efforts over the clearance period to assess and document the quality of the information from NFPA and NFIRS and make this more accessible and useable for NFIRS users" (2013).

The following is a response, originally given in September 2014, to the 2013 Terms of Clearance. The response was made public in 2017. It is a review of the NFIRS system, the many robust data quality checks and mechanisms which are an integral part of the system, and an assessment of the data quality both at the state level and at the data element level. The data element assessment is of the most commonly used data elements in the NFIRS data analyses. The NFIRS data from the three most recent years available at the time of this document's production (2009 to 2011) are reviewed. Although the USFA has no authority over the NFPA survey, a section drawn from published NFPA documents covering the NFPA survey methodology is also included.

About the National Fire Incident Reporting System

The NFIRS was established in 1975 as one of the first programs of the National Fire Prevention and Control Administration, which later became the USFA. The basic concept of the NFIRS has not changed since the system's inception. All states and all fire departments within them have been invited to participate on a voluntary basis. Participating fire departments report a common core of information on an incident and any casualties that ensue by using a common set of definitions. Detailed incident data are reported locally. Local agencies forward the completed NFIRS modules to the state agency responsible for the NFIRS data. The state agency combines the information with data from other fire departments into a statewide database and then transmits the data to the National Fire Data Center (NFDC) at the USFA. Data on individual incidents and casualties are preserved incident by incident at local, state and national levels.

From an initial six states in 1976, the NFIRS has grown in both participation and use. Over the life of the system, all 50 states, the District of Columbia, and more than 40 major metropolitan areas have reported to the NFIRS. More than 30,000 fire departments have been assigned participating NFIRS fire department identification numbers by their states. Once limited to fire incidents only, the NFIRS now encompasses all incidents to which the fire department responds: fire, Emergency Medical Services (EMS), hazardous materials (hazmat), and others.

Approximately one million fire incident records and 22 million nonfire incident records are added to the database each year. The NFIRS is the world's largest collection of incidents to which fire departments have responded.

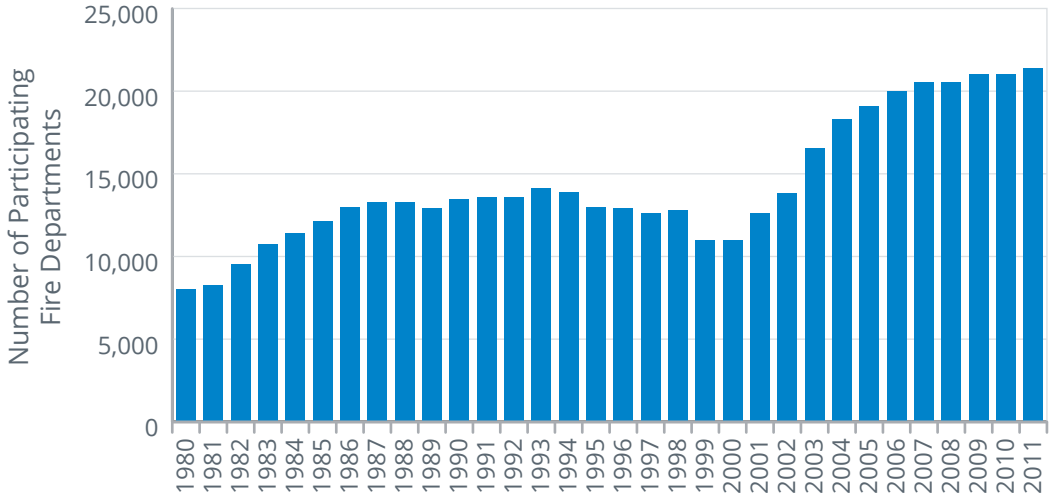
Between 1985 and 1999, the level of participation remained relatively constant: A few states came in or left the system each year, and at least 39 states reported to the NFIRS. Most years also included participation from the District of Columbia. The number of fire departments participating within the states remained relatively constant as well, with a slight dip in participation during the system migration from version 4.1 to 5.0 in 1999. In 2000, the number of states increased to 43. The Department of Defense adopted the NFIRS reporting, and fire department participation began to bounce back from the version 5.0 transition low. Since 2000, state and fire department participation has been steadily increasing. In 2003, the NFIRS reached a milestone with participation by all 50 states. The following year, the NFIRS achieved another significant goal: The NFIRS not only achieved the national goal of 100 percent state participation, including the District of Columbia, but also for the first time, the Native American Tribal Authorities submitted data.

The NFIRS continues to grow and mature. As of 2007, a new level of participation had been achieved: all 50 states, the District of Columbia, Native American Tribal Authorities, Northern Mariana Islands, and Puerto Rico all participated in the NFIRS for a total of 54 state, district, tribal authority, and commonwealth entities. However, the Northern Mariana Islands and Puerto Rico are no longer reporting incident data to NFIRS. Fire departments reporting fire incidents grew to 20,680 in 2011 (Figure 1). Across participating entities, 69 percent of U.S. fire departments reported fire incidents to the NFIRS in 2011.[3] The percentage of fire departments participating in the NFIRS varies from state to state,

[3]For 2011, NFPA estimated that there were 30,145 fire departments in the United States. NFPA, U.S. Fire Department Profile — 2014, http://www.nfpa.org/~/media/files/news-and-research/fire-statistics/fire-service/osfdprofile.pdf?la=en, January 2016.

with some states not participating at all in some years. With over two-thirds of all fire departments nationwide reporting fire incidents to NFIRS 5.0, the reporting departments represent a very large dataset that enables the USFA to make reasonable estimates of various facets of the fire problem. Although some states do require their departments to participate in the state system, participation in the NFIRS is voluntary. Additionally, if a fire department is a recipient of a Fire Act Grant, participation is required.[4]

Figure 1. NFIRS Fire Department Participation 1980 to 2011, Fire Incidents Only



Source: NFIRS.
Note: 1999 to 2008 includes participation from the NFIRS 4.1 and NFIRS 5.0 versions; 2009 and later includes participation only from the NFIRS 5.0.

Corresponding to increased participation, the numbers of fires, deaths and injuries, as well as estimates of dollar loss reported to the NFIRS, have also grown; an estimated 71 percent of all U.S. fires to which fire departments responded in 2011 were captured in the NFIRS.

There are, of course, many problems in assembling a real-world database, and the NFIRS is no exception. Although the NFIRS does not represent 100 percent of incidents reported to fire departments each year, the enormous dataset and good efforts by the fire service result in a huge amount of useful information. Because of advances in computer technology and data reporting techniques over the past 35 years, as well as improvements suggested by participants, the NFIRS has been revised periodically. The newest revision, NFIRS 5.0, became operational in January 1999.

The NFIRS 5.0 version captures information on all incidents, not just fires, to which a fire department responds. In addition to many data coding improvements, version 5.0 provides 11 modules that recognize the increasingly diverse activities of fire departments today. These modules, together, contain 567 data elements or fields.

[4]From the Assistance to Firefighters Grant Guidance and Application Kit (June 2012), if the applicant is a fire department, the department must agree to provide information, through established reporting channels, to the NFIRS for the period covered by the assistance. If a fire department does not currently participate in the incident reporting system and does not have the capacity to report at the time of the award, the department must agree to provide information to the system for a 12-month period that begins as soon as the department develops the capacity to report. See http://www.fema.gov/library/viewRecord.do?id=6007 (fy_2012_afg_program_guidance.pdf).

The Basic Module is the main module, which is completed for every incident. The other modules are filled out, when appropriate, to provide additional information on an incident. All 11 modules are listed in Table 1:

Table 1. NFIRS Modules

Module	Description
Basic Module	General information for each incident
Fire Module	Fire incident information
Structure Fire Module	Information on structure fires
Civilian Fire Casualty Module	Fire-related injuries or deaths to civilians
Fire Service Casualty Module	Injuries or deaths to firefighters
EMS Module	Medical incidents
Hazardous Materials Module	Hazardous materials incidents
Wildland Fire Module	Wildland or vegetation fires
Apparatus/Resources Module	Apparatus-specific information
Personnel Module	Personnel associated with apparatus
Arson Module	Intentionally set fire information

Source: NFIRS.

Data from the modules are grouped together each calendar year to create the Public Data Release (PDR) files in delimited text format (.txt) that are then released annually into the public domain. For the NFIRS data submitted prior to 2012, the PDR files were released in dBase format (.dbf). The Apparatus/Resources and Personnel Modules are excluded from the PDR because they are intended for local fire department use only, and the PDR dataset's main utility is intended for national analyses. The PDR files consist of a subset of the data fields contained within the NFIRS national production database. For example, data elements with sensitive or identifying information are removed, as are data elements that are wholly used for maintenance or production purposes. The PDR data structure has been considerably simplified from the production database's schema for ease of use. The PDR files from 2004 to the present only include fire and hazmat incidents and their related data tables. Prior to 2004, all incidents were included in the PDR files.

In its basic form, the NFIRS PDR files have a relational data structure where data from each incident module is represented by a row in a data table. The primary tables (basic incident and incident address) contain most of the Basic Module data. There is exactly one record in the basic incident table for every incident reported to the NFIRS. All other modules, represented by data tables with similar names (such as fire incident or civilian casualties), have records that are linked to the basic incident table through unique incident identification key fields (state, fire department ID, incident date, incident number and exposure number). Some module data are split across several tables (e.g., basic incident, incident address, and basic aid tables); one table (fire incident) combines data from two modules (Fire Module and Structure Fire Module). Some tables, such as fire incident, will only have one record for each relevant incident in the basic incident table, while tables such as civilian casualty may have several records linked to a single incident in the case where multiple injuries or deaths occur in the same incident.

NFIRS 5.0, the current version of the NFIRS, is the result of a collaborative effort between the USFA and state and local users. This version incorporates many improvements. The design of NFIRS 5.0 makes the system easier to use than previous NFIRS versions because it captures only the data required to profile the extent of the incident. Some fires, for example, require just basic information to be recorded, whereas others require considerably more detail.

State participation is voluntary, and each state specifies the NFIRS reporting requirements for its fire departments. States have the flexibility to adapt their state reporting systems to their specific needs. As a result, the design of a state's incident reporting system varies from state to state. The NFIRS 5.0 version was designed so that data from state systems can be converted to a single format that is used at the national level to aggregate and store the NFIRS data.

The proportion of 5.0 data has steadily increased since the introduction of NFIRS 5.0 in 1999 (Table 2). The proportion of 5.0 data rose to 99 percent by the 2008 dataset. Prior to 2009, the NFIRS 4.1 data in its converted form had been accepted by the system; however, the USFA only uses native 5.0 data in its NFIRS-based analyses and quality checks.[5] For this reason, the USFA multiyear analyses do not include NFIRS 5.0 data prior to 2003, as prior to 2003 the proportion of 5.0 data in the NFIRS PDR was less than 80 percent. Since Jan. 1, 2009, NFIRS 4.1 data are no longer accepted by the system.

Table 2. NFIRS Fire Incident Data Reporting by Version (Percent)

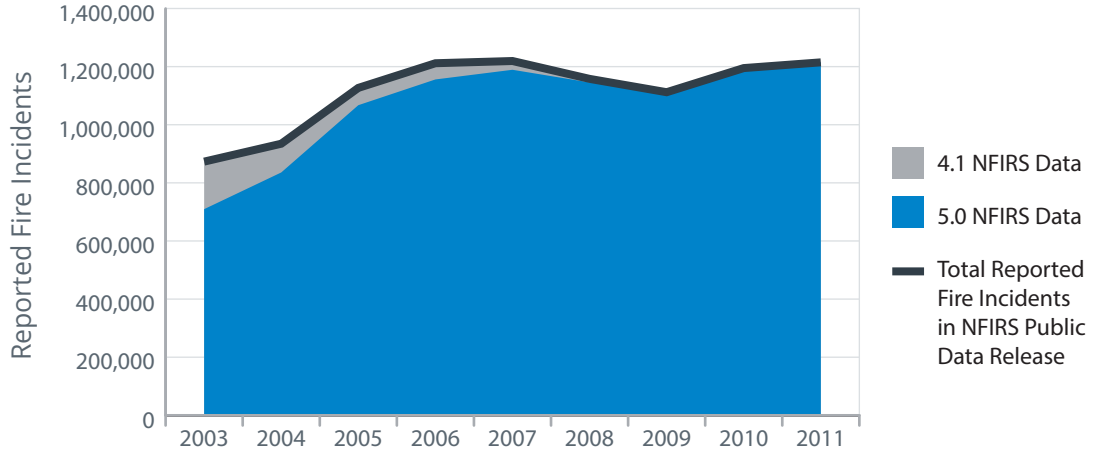
Year	NFIRS 4.1, 5.0 format	NFIRS 5.0
1999	92	8
2000	77	23
2001	48	52
2002	31	69
2003	19	81
2004	11	89
2005	5	95
2006	5	95
2007	2	98
2008	1	99
2009 — current	0	100

Source: NFIRS.

Incidents submitted to the national database and reflected in the PDR declined initially as the NFIRS 4.1 acceptance was phased out, but increased as departments fully adopted NFIRS 5.0. It is important to remember that the PDR is a one-time snapshot of the incident data submitted by the July 1 deadline. Additional data may be submitted to the national database after this deadline.

[5]Although, beginning in 2009, the NFIRS does not accept version 4.1 data, a few future-dated NFIRS Version 4.1 records from past years do appear in the database from user entry error; these records do not belong in the data year in which they were submitted and should not be included in analyses.

Figure 2. Total Reported Fire Incidents, NFIRS Public Data Release 2003 to 2011



Source: NFIRS.
Note: Includes all incident records in the NFIRS PDR except those incidents with fatal data quality errors.

National Fire Incident Reporting System Enhancements

Under the USFA Reauthorization Act of 2008, the U.S. Congress authorized and funded the USFA to develop a web-based data entry tool enhancement to the NFIRS. This upgrade to the system began in October 2008. In 2010, a data warehouse for generating output reports for use in analyses was developed with additional funding provided by Congress for the NFIRS enhancements. These improvements make reporting and accessing the NFIRS data much easier for fire departments.

In July 2010, the USFA completed and deployed the new web-based data entry tool. The Data Entry Browser Interface (DEBI) is a one-purpose tool for use by the fire service to document incident information within the NFIRS. While the functionality is the same as the NFIRS client Data Entry Tool that has been available for many years, DEBI allows entry of incidents using a standard web browser, eliminating the need to download, install and configure client software.

The development of a flexible NFIRS data warehouse with comprehensive data mining capabilities was completed in July 2011, but technical problems with the data and environment led to extensive delays. Deployment to national, state and fire department NFIRS users in three phases began in the summer of 2015, starting with users at the national level. Deployment to state and fire department users is forthcoming. The data warehouse allows NFIRS users to access and report on nationally reported data with significantly increased functionality over the current report-generation tool. The data have been transformed into a custom schema that greatly increases the speed of report generation and data access. NFIRS users will be able to generate reports using data from other departments and states, which was not previously possible.

The data warehouse includes a suite of 30 NFIRS data quality reports. The reports include functionality to:

- Track and assign data quality measures for critical data elements in each module and to provide overall data quality ratings by state and department.
- Identify incidents which, though valid, have serious data quality issues and list the problems found with the incidents.
- Identify incidents with outlier dates and times for incident response and duration.
- Identify incidents with dollar loss data quality issues.
- Identify incidents that should have been marked as invalid.
- Track departments and incidents with an abnormally high rate of fires under investigation.
- Identify incidents with mutual-aid field data quality issues.
- Identify near duplicate incidents.
- Identify incidents with missing casualty modules.

National Fire Incident Reporting System Training

To promote best practices, the USFA offers several NFIRS training courses for fire departments and state-level departments that manage the NFIRS. The courses are available at the National Fire Academy (NFA), online and within localities (i.e., field deliveries). These training courses include the "National Fire Incident Reporting System: Program Management" (NFIRS: PM) course (six-day NFA course), the "NFIRS 5.0 Self-Study" course (online), the "Introduction to NFIRS 5.0" course (two-day NFA course or field delivery course), and the "NFIRS Data Analysis and Problem Solving Techniques" course (two-day NFA course or field delivery course).

- The "NFIRS: PM" course teaches the participants the full duties of the NFIRS program management and enables participants to promote, support and manage NFIRS incident reporting successfully. This six-day course is offered as a resident course at the NFA and as a field delivery course. The foundation of the training is built on the use of the participants' own data in the national database. This allows the participants to see the quality of their data and the impact it has on analysis and decision-making. The course teaches the participants the five roles of NFIRS program management: communicating, administrating, planning, training and operating. The participants learn:
  - The NFIRS rules to ensure that data are coded according to the NFIRS standard.
  - To use tools (e.g., web-based reports, queries, Excel, and PivotTables) to identify data quality issues (e.g., invalid incidents, incomplete incidents, outdated incidents).
  - How to use the data to recognize problems in their communities.
  - How to effectively present the data to decision-makers and other users of fire data.
  - How to administer different training methods (e.g., train-the-trainer, initial and refresher) to ensure that accurate, complete and timely data are available.
  - How to develop a local analytical tool from the data in the national database by:
    - Exporting data from the national database.

- Importing the data to a local database.
- Building a local interactive tool to display, troubleshoot, query and analyze the data.

- The "NFIRS 5.0 Self-Study" (online) course provides an overview of the incident reporting system, its modules, and its rules for documenting incidents.
- The "Introduction to NFIRS 5.0" course emphasizes how to properly document incidents using standardized NFIRS data elements and codes for achieving uniformity in incident reporting.
- The "NFIRS Data Analysis and Problem Solving Techniques" course teaches the participants how to better evaluate the reported data, as well as how to use the data to identify problems, evaluate resources and measure services provided. By using their own data in the national database, participants gain a direct correlation to the training and its immediate value to their departments and communities.

This training program is designed specifically to support local fire service organizations and assists them in providing data both to management and decision-makers, to the state uniform fire reporting system, and to the NFIRS nationwide. Additional information on the NFIRS training courses can be found at https://www.usfa.fema.gov/data/nfirs/support/training.html.

To assist fire departments who use NFIRS to improve data quality and reliability, the USFA publishes short, informative notices called NFIRSGrams. By addressing frequently asked questions and common mistakes made when completing incident forms, these bulletins provide coding help to fire department personnel using the NFIRS. NFIRSGrams also help NFIRS users to better understand their impact on the quality of the information from the NFIRS at the local, state and national levels.

The USFA's NFIRS Support Center also offers a consolidated national help desk to provide technical support to fire departments and NFIRS state program managers regarding all aspects of the NFIRS.

Uses of the National Fire Incident Reporting System

NFIRS data are used extensively at all levels of government for major fire protection decisions. At the local level, incident and casualty information is used for setting priorities and targeting resources. The reported data are particularly useful for designing fire prevention and educational programs, as well as EMS-related activities specifically suited to the real emergency problems local communities face.

At the state level, the NFIRS is used in many capacities. One valuable contribution is that some state legislatures use these data to justify budgets and to pass important bills on fire-related issues, such as sprinklers, fireworks and arson.

Many federal agencies, in addition to the USFA, make use of NFIRS data. NFIRS data are used, for example, by the Consumer Product Safety Commission (CPSC) to identify problem products and to monitor corrective actions. The Department of Transportation uses NFIRS data to identify fire problems in automobiles, which has resulted in mandated recalls. The Department of Housing and Urban Development uses the NFIRS to evaluate safety of manufactured housing (mobile homes).

The USFA uses the data to design prevention programs, to order firefighter safety priorities, to assist in the development of training courses at the NFA, and for a host of other purposes. Thousands of fire departments, scores of states, and hundreds of industries have used the data. The potential for even greater use remains. The USFA report "Uses of NFIRS: The Many Uses of the National Fire Incident Reporting System" further describes the uses of the data and is available online at http://usfa.kohalibrary.com/app/work/159371.

The National Fire Incident Reporting System and the National Fire Protection Association Survey

There are two major sources of data about the U.S. fire problem: the USFA's NFIRS and the NFPA Survey of Fire Departments for U.S. Fire Experience. The NFPA is an international nonprofit organization whose mission is to reduce the burden of fire and other hazards.

While the USFA provides fire departments with the NFIRS as a method to report fire data to understand the details of the U.S. fire problem — how fires start, where they occur, when they occur, what (if any) equipment is involved, and other associated elements of information — the NFPA surveys fire departments each year to determine the nature and characteristics of fire departments across the U.S. and uses the data collected in the survey to estimate the magnitude of the fire problem. The NFPA's Survey of Fire Departments for U.S. Fire Experience is based on a stratified random sample of U.S. fire departments.[6] The sample of departments is stratified by size of community protected, and a ratio estimation methodology is used to develop national-level summary estimates on fire loss statistics (the total numbers of reported fires, fire deaths, fire injuries and direct dollar loss), as well as summary estimates of fires and losses by major incident types (i.e., structure, vehicle, outside and other).

Thus, overall estimates of the fire problem come from the NFPA's annual Survey of Fire Departments for U.S. Fire Experience. As noted, this survey produces national level summary estimates on fire loss statistics, as well as summary estimates of fires and losses by major incident types (i.e., structure, vehicle, outside and other). The summary estimates by major incident type are further broken down to the next tier — e.g. residential structures, highway vehicles, etc. The raw NFPA survey data are of a proprietary nature and are not available to the public, the USFA, or various other national fire data analysts. More information regarding the NFPA survey is provided in a later section of this report.

All nationally-based estimates on subsets of fire data, however, are derived by using the NFPA estimates to scale up the raw NFIRS subset data, which is a standard statistical technique. These "national estimates" are **not** the raw totals from the NFIRS. The estimates are based on a method of apportioning the NFPA estimates for total fires, structure, vehicle, outside and other fires.[7] Generally, these national estimates are derived by computing a percentage of fires, deaths, injuries or dollar loss in a particular NFIRS category and multiplying it by the corresponding total estimate from the NFPA

[6]For detailed information regarding the NFPA's survey methodology, see the NFPA's annual report on Fire Loss in the U.S.: http://www.nfpa.org//~/media/files/news-and-research/fire-statistics/overall-fire-statistics/osfireloss.pdf.

[7]The foundation of computing national estimates is based on "The National Estimates Approach to U.S. Fire Statistics" by Hall, J. and Harwood, B.: http://www.nfpa.org/~/media/files/news-and-research/fire-statistics/latest-estimates/nationalestimatesapproach.pdf?la=en.

annual survey.[8] In analyses, the unknown and missing data values should not be ignored. The approach taken by the USFA in presenting the data is to provide not only the "raw" percentages of each category, but also the "adjusted" percentages computed using only those incidents for which data were provided.

One problem with this approach is that the proportions of fires and fire losses differ between the large NFIRS dataset and the NFPA survey sample.[9] Nonetheless, to be consistent with approaches being used by other fire data analysts, the NFPA estimates of fires, deaths, injuries and dollar loss are used as a starting point. The details of the fire problem below the national level are based on proportions from the NFIRS. Because the proportions of fires and fire losses differ between the NFIRS and the NFPA estimates, from time to time, this approach leads to inconsistencies. These inconsistencies will remain until all estimates can be derived from NFIRS data alone.

Ideally, one would like to have all of the data for the various components come from one consistent data source — the NFIRS. One of the critical pieces of data necessary to do so is missing: the overall population protected by all reporting fire departments. This "residential population protected" is not reported to the NFIRS, nor are the data easy to come by, especially where a county or other jurisdiction is served by several fire departments that each report their fires independently.

Other issues — such as full reporting because of reporting deadlines, data access, budgetary considerations, and the like — add a layer of complexity to using the NFIRS data to create estimates. Through the years, a number of ad hoc studies have been undertaken to identify NFIRS nonresponse bias, but none have identified major reporting issues. Most of the NFIRS data exhibit stability from one year to the next. Results based on the full dataset are generally similar to those based on part of the data, another indication of data reliability. The dataset is so large — on average, over the past five years, about 67 percent of reported fires[10] — and reasonably distributed geographically and by size of community that it is used as input to developing national estimates.[11]

[8]The NFPA summary estimates are used for the overall U.S. fire losses; fire losses from structure, vehicle, outside and other fires; and as the basis for USFA's estimates of residential and nonresidential building fires and losses. The alternative approach for these summary numbers is to use the relative percentage of fires (or other loss measures) from the NFIRS and scale up to (multiply by) the NFPA estimate of total fires.

[9]For additional information regarding the differences in proportions of fires and losses between NFIRS data and the NFPA survey, see the section entitled Differences Between NFIRS Data and NFPA Survey Data in "USFA's Data Sources and Methodology Documentation," March 2014, http://www.usfa.fema.gov/downloads/pdf/statistics/data_sources_methodology.pdf.

[10]The data reported in the NFIRS is continually growing: Between 2007 and 2011, NFIRS data represented 67, 61, 57 and 59 percent of reported fires, fire deaths, fire injuries and direct dollar loss when compared to the statistical estimates from the NFPA's Annual Survey of Fire Departments. Between 2009 and 2011 these percentages rose to 70, 64, 58 and 62 respectively.

[11]USFA's NFIRS Representativeness Study (October 2008) previously submitted to the OMB.

Incident Reporting and Submission Process

Over 20,000 fire departments[12] and state governments actively work on improving the information they enter into the NFIRS. Their data, based on their own needs for high quality fire and other incident data, is used to plan, fund and implement effective local, state and regional fire and emergency services programs.

At the same time, the NFDC engages in efforts to both document and communicate to users the content and quality of fire information products resulting from NFIRS data. The NFDC accomplishes these efforts through an ongoing and robust data quality assessment process, detailed analysis of the NFIRS data and production of reports, training and informational bulletins, data analysis tools, and a congressionally funded NFIRS enhancement project.

In addition to the suite of data quality reports that will be available to NFIRS data users beginning summer 2014, the NFIRS data are quality-checked during data entry, data submission to the national database, and prior to the creation of the PDR. The reporting, submission and subsequent dissemination process is shown in Figure 3.

Incident Reporting

The NFIRS reporting format is mostly consistent with the NFPA Standard 901, *Standard Classifications for Incident Reporting and Fire Protection Data*, "Uniform Coding for Fire Protection" 2001 version. The current version of the NFIRS, version 5.0, expands the reporting of data beyond fires to include the full range of fire department activity on a national scale. It is an all-incident reporting system.

Within the NFIRS's participating states, participating local fire departments fill out incident, casualty and optional reports for fires and other incident types as they occur. The majority of the data are reported electronically through third-party software, the NFIRS data entry tools, or the reporting department's own system. In very few departments, the data may be written by hand on paper forms and entered electronically at a later time. They forward the completed incidents electronically (or via paper forms if the department has no other means) to their state office where the data are validated and consolidated into a single electronic database. Each fire department is responsible for the data they report, and each department is encouraged to ensure that their data are complete and accurate. The extent of data quality checks varies from department to department.

At the state level, the data from the participating fire departments are validated. Data are validated automatically by the application on import into the NFIRS database. Data are checked to make sure required fields are present and that field values are within acceptable ranges. Log files are generated with validation results which are available to the user via either email (Bulk Import Utility) or access to the logs stored on their local computer (Data Entry Tool client software). The extent of data quality checks varies from state to state. Incident data that cause critical errors and fail validation checks are sent back to the local fire department for correction and resubmission.

[12]NFIRS; see also Figure 1.

Submission to the National Production Database

Periodically, the aggregated statewide data are sent to the NFDC to be released and included in the national production database. When and how states send their data depends on the individual state — some states (and their departments) use the USFA's data entry tool to enter, store and manage their data on the USFA's federal server warehouse. Other states, typically the larger states, keep their data locally and report their incident data en masse, quarterly or yearly, just prior to the annual federal reporting deadline. Submission guidelines[13] call for quarterly reporting at a minimum during the year and an annual deadline for states on July 1. Regardless of the submission or entry method, all state data submitted to the federal servers are stored in individual state partitions. From the state partitions, the states manage their final datasets prior to releasing their data to the national production database. All state data belongs to the individual states, with the state having the sole responsibility for its content. The NFDC is the custodian of the data and does not have the authority to make changes to the state data in the state partitions.

Public Data Release and Data Review

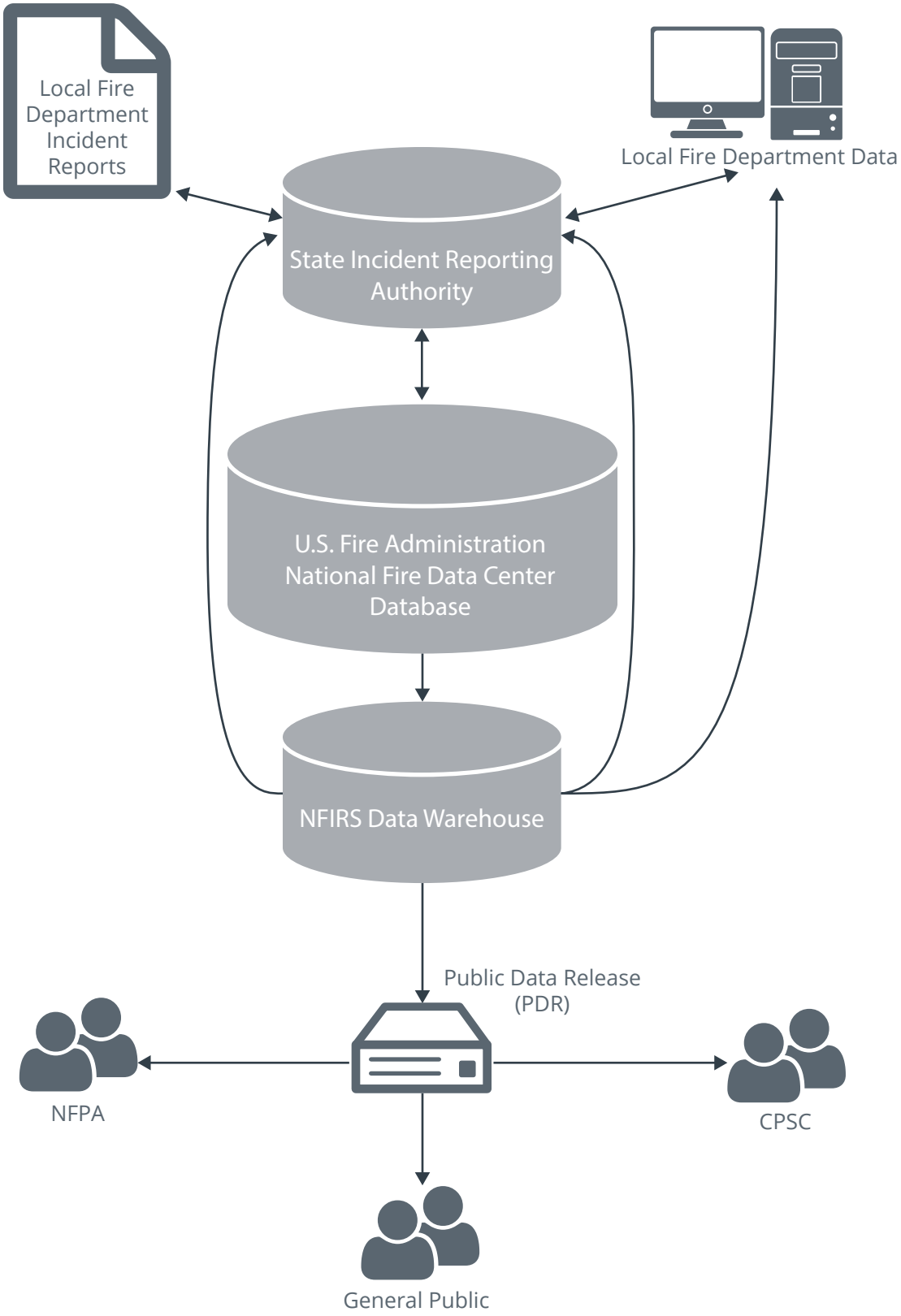
After the data submission deadline, a "snapshot" of the national production database is taken. It is from this snapshot that the PDR is created. During the PDR process, the released incident data are checked for fire death and reported dollar loss consistency. Because deaths and total dollar loss are important metrics of the U.S. fire problem, incidents with more than 20 million in dollar loss or more than five deaths are sent back to the state for verification.[14] Once the PDR is finalized, it is packaged on a CD with documentation and made available to the public, other government agencies, and outside organizations by request.

Internally, once the annual PDR is completed, the USFA assigns data quality ratings based on a calculated formula to each individual department, each state, and nationally overall. The data quality rating is calculated using quality measures of the fields used in the creation of annual fire causes and is intended to help track the quality of the data used by the USFA to assign these causes each year.

[13]NFIRS Reporting Guidelines: https://www.nfirs.fema.gov/system/guidelines.shtm.

[14]Injuries are also an important metric; however, injuries totals are not checked, as it is possible to have a large number of injuries at an incident, making checking this field at a national level difficult.

Figure 3. NFIRS Incident Reporting, Submission and Dissemination Process



Data Quality and U.S. Fire Administration Interaction With States

Three criteria are used in the monitoring of data in the NFIRS during the year: the data are complete, the data are accurate, and the data are current. These criteria are monitored by creating reports from the database that show the number of reporting fire departments, the number of incidents by state, the number of invalid incidents, and the number of unreleased incidents. The USFA provides the reports to the state NFIRS program managers and works with them to resolve any data issues. Technical assistance (e.g., telephone support or site visits) is provided to states to help address any data quality and data reporting needs.

Data quality is an area of great importance. Audits of the data are performed during the year to identify any inconsistences in the data. The audits focus on three criteria: gaps in reporting, critical errors in the data, and outliers in the data. In particular, the USFA works closely with states to monitor the quality of data coming from third-party vendor software. Each state is responsible for enforcing that the NFIRS third-party software sold by vendors in their state is compliant with NFIRS standards. The USFA will assist states in monitoring vendor data quality issues or will contact vendors directly to discuss an issue at a state's request. Other data quality issues are questionable high dollar-loss incidents and questionable high numbers of fire deaths. Annually, the USFA queries the database for questionable values (i.e., outliers) and verifies the values with state-level NFIRS program managers and local-level NFIRS program managers. The data quality steps are important to ensure that the data meet the USFA's three criteria before the data are released in the NFIRS PDR format.

Data Quality Checks by the National Fire Data Center

The PDR is further quality checked by the NFDC staff and statisticians upon receipt and prior to release to the general public. The NFDC staff and statisticians double-check for items such as:

- Missing required modules.
- Null values in required data elements.
- Invalid values or codes that are not in the current NFIRS Complete Reference Guide (CRG).
- Large outliers.
- Duplicates in multientry data elements.

Any issues are reported to the NFIRS program manager, who in turn reports them to the NFIRS support contractor. The support contractor investigates and incorporates any needed changes and updates into the NFIRS validation rules or the PDR generation procedures. If the record clearly contains outliers, it is generally the USFA's practice to recommend excluding it from analyses. Before excluding such records as a data quality check, a quick internet search is conducted to see if some unusual fire did occur. As described above, the USFA follows up with the fire department that submitted the incident record for data verification.

Although invalid values and duplicates in multientry fields are reviewed, these values are not necessarily changed on the PDR as each major data user (e.g., the NFDC itself, CPSC, the NFPA and others) has its own method of analyzing the fire data in the PDR.

Additionally, the NFDC staff and statisticians, in their analytical database based on the PDR data, check the following:

- That all incidents are version 5.0.
- For null or missing values in property use when:
  - Mutual or automatic aid is received.
  - Other aid is given.
  - No aid is given or received.

  If null values occur, the incidents are deleted from the analytic database.
- For fires, check for null values in the AID field. If null/missing values occur, the incidents are also deleted from the analytic database.

The USFA's analytic contractor performs additional data quality checks as it loads the PDR data into its NFIRS database. The analytic contractor checks for:

- Potential duplicate entries: Entries whose unique, identifying information is identical — save for a leading or trailing blank or zero.
- Orphan records: Records in the secondary files that do not have a parent record in the main data file.

Any potential duplicate entries and orphan records are reported back to the NFDC and to the NFIRS program manager. The NFDC recommends that if records under either of these instances occur, they should be deleted from the NFDC analytic database. Major data users are notified of the NFDC decisions and may or may not implement them in their own datasets.

Key Data Considerations for the User

Unknown Entries

In a small number of incident or casualty reports sent to the NFIRS, many data items are either not reported (i.e., null, blank or missing values) or are reported as "unknown." For most coded fields, "U," "UU" and "UUU" are codes available in NFIRS 5.0 to indicate "unknown." In some cases, even after the best attempts by fire investigators to document the fire, the information is truly unknown. In other cases, the information reported as unknown in the initial NFIRS report is not updated after the fire investigation is completed.

In analyses, the unknowns should not be ignored. The approach taken by the USFA in presenting the data is to provide not only the "raw" percentages of each category, but also the "adjusted" percentages computed using only those incidents for which data were provided.

Null and blank values differ from entries coded as unknown. Null and blank values are considered unreported data and differ in meaning and substance from "unknown" data. In data elements where information is required, a null or blank value may invalidate the record.

Unknown entries are of the highest concern for data quality. For some data elements, the number of incidents with null, blank or unknown entries can be larger than the number of incidents for which data were provided. Through the various USFA and NFDC training initiatives and efforts by various fire organizations (e.g., the National Association of State Fire Marshals (NASFM)), fire departments are encouraged to reduce the number of unknown entries by fully documenting the fire incident.

Fires Versus National Fire Incident Reporting System Record Counts

It is important to underscore that the raw NFIRS record counts are not the total number of fires reported by fire departments each year. The NFIRS is a large but not randomly selected sample of fires reported to fire departments, and as such, analyses address the relative proportions (percentages) or apply the national estimates methodology to produce estimates of the aspect of the fire problem that is under analysis.

Counting Fires Versus Counting Fire-Related Statistics

When the data element in question is a fire-related data element (i.e., captured under the fire modules — fire, structure fire, wildland, etc.), fires are counted. When the data element in question is in the casualty modules, casualties are counted. Even the most seasoned fire data analyst may overlook this distinction from time to time. The proper phrasing of analysis for casualties counted from fire data elements is "fires with casualties/injuries/deaths" or an equivalent statement.

Confined Versus Nonconfined Fires

Confined fires are generally small, low-loss fires and are allowed abbreviated reporting. This limited reporting can result in an increase in the proportion of null or missing values. The USFA generally separates the analyses into a confined fires version and a nonconfined fires version and recommends that others do the same. The resulting analysis can be very generic, but there are instances where this is reasonable. While the NFPA survey includes a category for confined fires, the NFPA does not publish estimates of confined fires. It is unclear what the effect of this has on estimates derived from NFIRS datasets that include confined fires.

Mutual Aid

Some records in the NFIRS refer to aid provided to another fire department — either mutual aid given to an outside fire service entity upon request of the outside entity, or automatic aid given through mutual-aid agreements. To isolate individual fire incidents, only records of the primary fire department are included. This is achieved by excluding records reflecting aid provided, as in essence, not excluding aid incidents when analyzing incidents may result in the double counting of those incidents where both the giving and receiving departments report to the NFIRS.

This exclusion is also a data quality consideration. The fire department receiving aid is considered the "owner" of the incident, and this fire department is responsible for providing the incident data. The aid-giving department's incident record is generally only a record of having given aid and most, if not all, data elements are not required or submitted. Including these records would result in an unacceptably large number of unknown entries.

Mutual-aid given incidents are excluded from all analyses with one major exception: when counting firefighter casualties.

Types of Fires

The general categories of fire incidents are broadly defined by the type of incident, with the four major incident types of structure, vehicle/mobile properties, outside, and other. Structure fires are further broken down into residential and nonresidential structure fires based on the property definitions (see below), as well as by type of structure — building and nonbuilding fires. Type of incident, property use, and type of structure (for structure fires) are required elements with near 100 percent compliance.

Property Definitions

The general categories of property use are defined by the property use data element. Property use is a required field; blank and null values are not expected (but do occur occasionally under specific rare circumstances[15]). Null values in property use receive special treatment as the requirements for certain types of incidents changed in 2006. These specifications are discussed more fully in the USFA's "National Fire Incident Reporting System Version 5.0 Fire Data Analysis Guidelines and Issues." These guidelines discuss specific data elements and how the USFA analyzes and interprets the results of the analyses.

Multiyear and Trend Analyses

It is important to note that NFIRS data may fluctuate from year to year, resulting in variability. It is possible that any given year may be an anomalous year for a subset of fire data or for the data overall. Statistically rare, but real-world incidents do occur. Large conflagrations, such as the various California wildfires; large petrochemical plant fires, such as the 1989 Houston Ship Channel fire; and large multifatality, multi-injury fires, such as the 1980 MGM Grand Hotel fire or the 2003 fire at The Station Nightclub, can have one-time effects on fire analyses for that year.

For these reasons — yearly fluctuation and single-event spikes — it is often preferable to aggregate several years of data for analyses. The USFA uses three-year averaged data and, where possible, analyzes trends of five or more years of data. Trends are usually described by the change in the linear best fit. Moving averages are another type of trend analyses available.

[15]The entry rules that allow blank and null property types to occur were eliminated as of January 2015.

Cause

The cause of a fire is often a complex chain of events. To make it easier to grasp the "big picture," the USFA originally developed a cause hierarchy for structure fires, where the majority of fire losses occur.[16] The cause for other incident types is based on the distributions of the NFIRS cause of ignition data element. This data element captures a very broad sense of the cause of the fire.

The hierarchy schema provides three levels of cause descriptions: a set of more detailed causes, a set of midlevel causes, and a set of high-level causes. The midlevel categories of fire causes, such as heating, cooking and playing with heat source, are used by the USFA. Fires are assigned to one of the 16 midlevel cause groupings using a hierarchy of definitions, as shown in Table 3. A fire is included in the highest category into which it fits on the list. If it does not fit the top category, then the second one is considered, and if not that one, the third and so on.

In principle, it is the cause of the fire which results in deaths, injuries and dollar loss that should be analyzed, not numbers of deaths and injuries associated with fire causes.

Table 3. Midlevel Structure Fire Cause Groupings

Cause Category	Definition
Exposure	Caused by heat spreading from another hostile fire.
Intentional	Cause of ignition is intentional, or fire is deliberately set.
Cause under investigation	Cause is under investigation, and a valid NFIRS Arson Module is present.
Playing with heat source	Includes all fires caused by individuals playing with any materials contained in the categories below, as well as fires where the factors contributing to ignition include playing with a heat source. Children playing with fire are included in this category.
Natural	Caused by the sun's heat, spontaneous ignition, chemicals, lightning, static discharge, high winds, storms, high water including floods, earthquakes, volcanic action, and animals.
Other heat	Includes fireworks; explosives; flame/torch used for lighting; heat or spark from friction; molten material; hot material; heat from hot, or smoldering objects.
Smoking	Cigarettes, cigars, pipes and heat from undetermined smoking materials.

[16]The structure fire cause hierarchy and specific definitions in terms of the NFIRS 5.0 codes may be found in the "National Fire Incident Reporting System Version 5.0 Fire Data Analysis Guidelines and Issues," USFA, July 2011, http://www.usfa.fema.gov/downloads/pdf/nfirs/nfirs_data_analysis_guidelines_issues.pdf. The hierarchy involves a large number of subcategories that are later grouped into the 16 mid-level cause categories, then the eight high-level cause groupings.

Table 3. Midlevel Structure Fire Cause Groupings — continued

Cause Category	Definition
Heating	Includes confined chimney or flue fire, fire confined to fuel burner/boiler malfunction, central heating, fixed and portable local heating units, fireplaces and chimneys, furnaces, boilers, water heaters as sources of heat.
Cooking	Includes confined cooking fires, stoves, ovens, fixed and portable warming units, deep fat fryers, open grills as sources of heat.
Appliances	Includes televisions, radios, video equipment, phonographs, dryers, washing machines, dishwashers, garbage disposals, vacuum cleaners, hand tools, electric blankets, irons, hairdryers, electric razors, can openers, dehumidifiers, heat pumps, water cooling devices, air conditioners, freezers, and refrigeration equipment as sources of heat.
Electrical malfunction	Includes electrical distribution, wiring, transformers, meter boxes, power switching gear, outlets, cords, plugs, surge protectors, electric fences, lighting fixtures, electrical arcing as sources of heat.
Other equipment	Includes special equipment (radar, x-ray, computer, telephone, transmitters, vending machine, office machine, pumps, printing press, gardening tools, agricultural equipment), processing equipment (furnace, kiln, other industrial machines), service, maintenance equipment (incinerator, elevator), separate motor or generator, vehicle in a structure, unspecified equipment.
Open flame, spark (heat from)	Includes torches, candles, matches, lighters, open fire, ember, ash, rekindled fire, backfire from internal combustion engine as sources of heat.
Other unintentional, careless	Includes misuse of material or product, abandoned or discarded materials or products, heat source too close to combustibles, other unintentional (mechanical failure/malfunction, backfire).
Equipment misoperation, failure	Includes equipment operation deficiency, equipment malfunction.
Unknown	Cause of fire undetermined or not reported.

Source: USFA.

The percentage of unknown fire causes has seen a steady increase since the introduction of the NFIRS Version 5.0. This increase may be due, in part, to the fact that the original cause hierarchy does not apply as well to NFIRS 5.0 data.[17] While the cause hierarchy

[17]See the full description of the cause hierarchy in "Fire in the United States 1995-2004, 14th edition."

was revised to incorporate the 5.0 data as best possible, the result is that, where the fit is imperfect, many incidents are assigned to the unknown cause category.

Further, with the current NFPA 921, *Guide for Fire and Explosion Investigations,* there may be reluctance on the part of some fire departments to enter anything but "unknown" in causal fields, unless these elements can be determined with certainty.[18] NFPA 921 sets guidelines for scientific-based investigation and analysis of fire and explosion incidents and is considered the foremost guide for rendering accurate opinions as to incident origin, cause, responsibility and prevention. The issues surrounding NFPA 921's role in fire departments' willingness to determine fire cause are complex, but if the investigation does not or cannot meet these guidelines, often the preliminary cause of "under investigation" remains in the NFIRS, and under the cause hierarchy, those fires are assigned to the unknown cause category.

The NASFM recently studied the problem of the large numbers of unknown data in the causal data elements.[19] This report identified five recommendations that have resonance for data quality in general to solve the issue of unreported fire causal information:

- Whether a cause is determined or remains undetermined after investigation, fire departments must "Close the Loop" by updating the codes in the NFIRS incident report. Codes need to be updated in the system once a cause is determined. "Under Investigation" reports should always be revisited and updated after the investigation.
- Clear the "Litigation Cloud" by addressing the liability concerns for cause determination through a multipronged approach. Several approaches to this area are suggested.
- Improve training for chiefs, officers and front-line personnel on the concepts and reasons behind the need for reporting, as well as how fire incident data can be used to advance fire prevention and suppression goals.
- Improve the NFIRS by developing and implementing the next generation of the NFIRS — what is commonly referred to as NFIRS Version 6 — with input from stakeholders who are tasked with inputting the data at the local level, as well as those who analyze and use the data at all levels.
- Improve quality assurance and quality control in fire incident reporting throughout the system. Specific systemic changes to improve quality assurance and quality control include designating a "Data Champion" to be responsible for NFIRS quality control/quality assurance at the local level; providing a mechanism for departments to report "no incidents" periodically; emphasizing the importance of dedicated state NFIRS program managers to work with departments in their state; adopting a standard

[18]National Association of State Fire Marshals Fire Research & Education Foundation, "Conquering the "Unknowns" Research and Recommendations on the Chronic Problem of Undetermined and Missing Data in the Causal Factors Sections of the National Fire Incident Reporting System," final report for Award No. EMW-2011-FP-00356 Assistance to Firefighters Fire Prevention & Safety Grant Program Federal Emergency Management Agency. Undated. http://www.firemarshals.org/resources/Documents/Fire%20Incident%20Data%20Collectin/NASFMFoundationFinalReportConqueringtheUnknowns.pdf.

[19]National Association of State Fire Marshals Fire Research & Education Foundation, "Conquering the "Unknowns" Research and Recommendations on the Chronic Problem of Undetermined and Missing Data in the Causal Factors Sections of the National Fire Incident Reporting System," final report for Award No. EMW-2011-FP-00356 Assistance to Firefighters Fire Prevention & Safety Grant Program Federal Emergency Management Agency. Undated. http://www.firemarshals.org/resources/Documents/Fire%20Incident%20Data%20Collectin/NASFMFoundationFinalReportConqueringtheUnknowns.pdf.

operating procedure or standard operating guideline on completing incident reports; and revitalizing the National Fire Information Council with a focus on developing strategies and training to improve the quality of the nation's NFIRS data.

The NASFM report notes that there will always be fires whose cause cannot legitimately be determined, even after investigation. For many incidents, however, definite steps can be taken toward reducing the level of "undetermined" or unreported responses in the causal factors section of the NFIRS. "To achieve this will require confronting some difficult, thorny issues that do not have clear solutions. But, if you don't write it down, it didn't happen, and we may never be able to quantify what has been lost by not having sufficient data on the causes of fires."[20]

Smoke Alarms and Smoke Alarm Performance

Smoke alarm data are reported at the fire-incident level (not the casualty level). Smoke alarm data are analyzed for presence, operation, and effectiveness; other smoke alarm data elements are not analyzed at this time. Smoke alarm performance is analyzed for nonconfined fires only. Confined fires have abbreviated reporting, and the various smoke alarm data are not required. From a data quality perspective, including confined fire smoke alarm data (which is mostly null) with the more robust nonconfined fire smoke alarm data degrades the data quality.

Dollar Loss Data

It is difficult to estimate dollar loss. Insurance claim data are generally not available to the public, and fire departments rarely have the time to research the actual value of a property. It is not unusual for the property or content loss to be unreported. Even when reported, there are often inconsistencies. For example, there are many reported fires where the fire spread suggests damage, but property loss is not reported or seems low (or high) for the extent of reported fire spread.

Structures, Buildings and Nonbuildings

The NFIRS 5.0 allows for the differentiation of structures between buildings and nonbuildings. In the NFIRS, a structure is a built object and can include nonbuildings, such as platforms and tents; connective structures, such as bridges or fences; telephone poles; and various other structures in addition to buildings.

Structures are split into building and nonbuilding structures for purposes of data quality. While most structures are buildings (analyses of NFIRS structure fires between 2009 and 2011 show that 93 percent of structure fires occur in buildings), the distinction between buildings and nonbuildings is particularly important when determining the effectiveness of nonbehavior-based fire safety mechanisms, such as smoke alarms and residential sprinklers. These important components of early fire detection apply to buildings and not necessarily to these other types of structures.

[20]National Association of State Fire Marshals Fire Research & Education Foundation, "Conquering the "Unknowns" Research and Recommendations on the Chronic Problem of Undetermined and Missing Data in the Causal Factors Sections of the National Fire Incident Reporting System," final report for Award No. EMW-2011-FP-00356 Assistance to Firefighters Fire Prevention & Safety Grant Program Federal Emergency Management Agency. Undated. http://www.firemarshals.org/resources/Documents/Fire%20Incident%20Data%20Collectin/NASFMFoundationFinalReportConqueringtheUnknowns.pdf.

The National Fire Incident Reporting System Data Quality

Two major assessments are used by the USFA when monitoring the quality of the incident data reported by the participating states: the overall quality of the data submitted by the state as a unit and the overall quality of key data elements across all participating states and fire departments.

State-Based Data Quality

Based on the USFA's state data quality rating, 12 states — Nebraska, Massachusetts, Alaska, North Dakota, Montana, Idaho, South Dakota, Utah, Colorado, California, Florida and Washington — as well as the District of Columbia, have demonstrated consistent, high-quality data (Figure 4). Nebraska and the District of Columbia have vied for the top-ranked state for data quality over the 2009 to 2011 period.

As a group, the states with the best data quality ratings relative to the national average are those in the central Midwest, throughout the Northwest, and California, with the mid-Atlantic and southeastern states (with the exception of Florida) having the lowest ratings (Figure 5). The reasons for this consistent pattern are not clear.

Figure 4. Three-Year NFIRS Data Quality by State Relative to National Average Data Quality Measure, 2009 to 2011

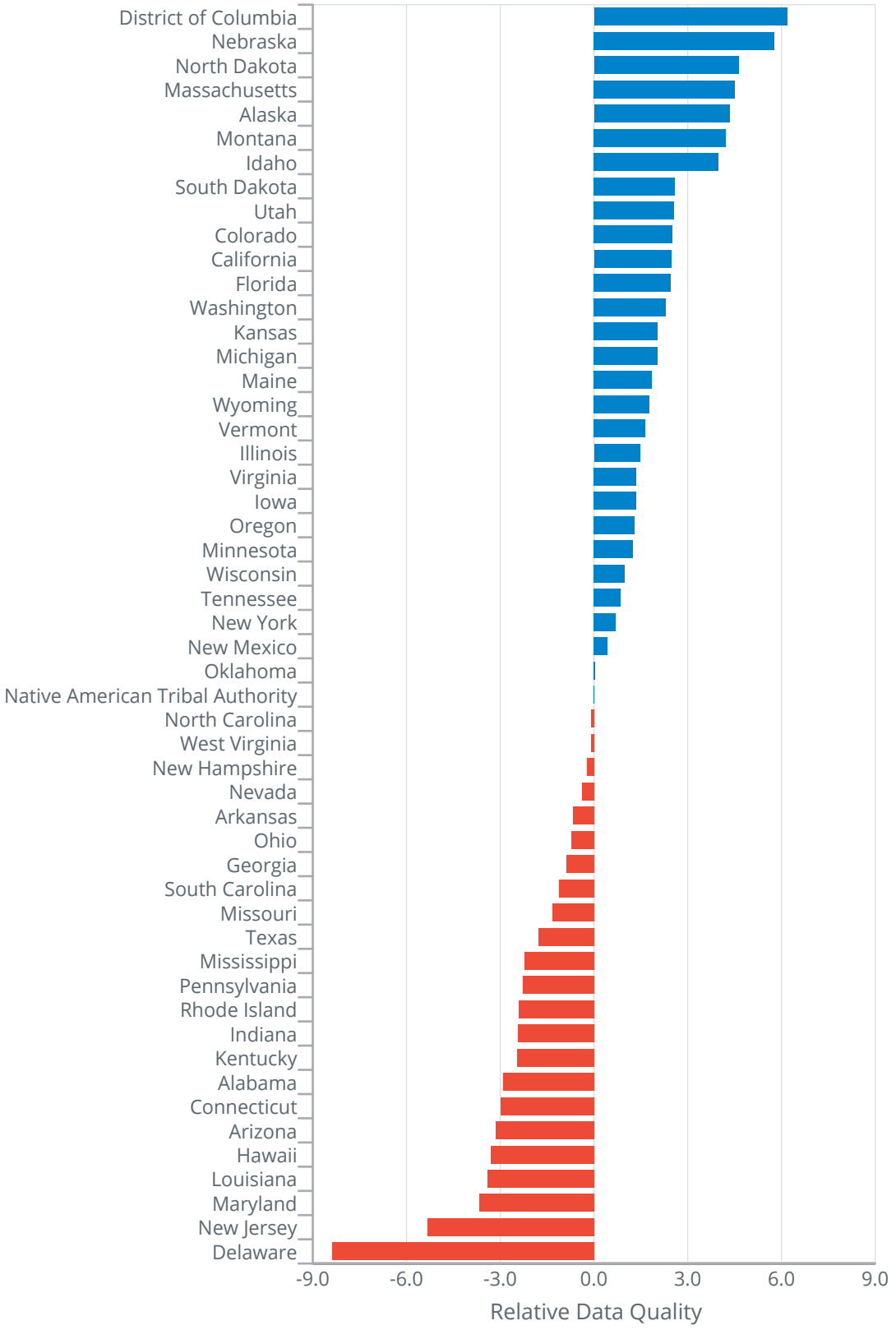
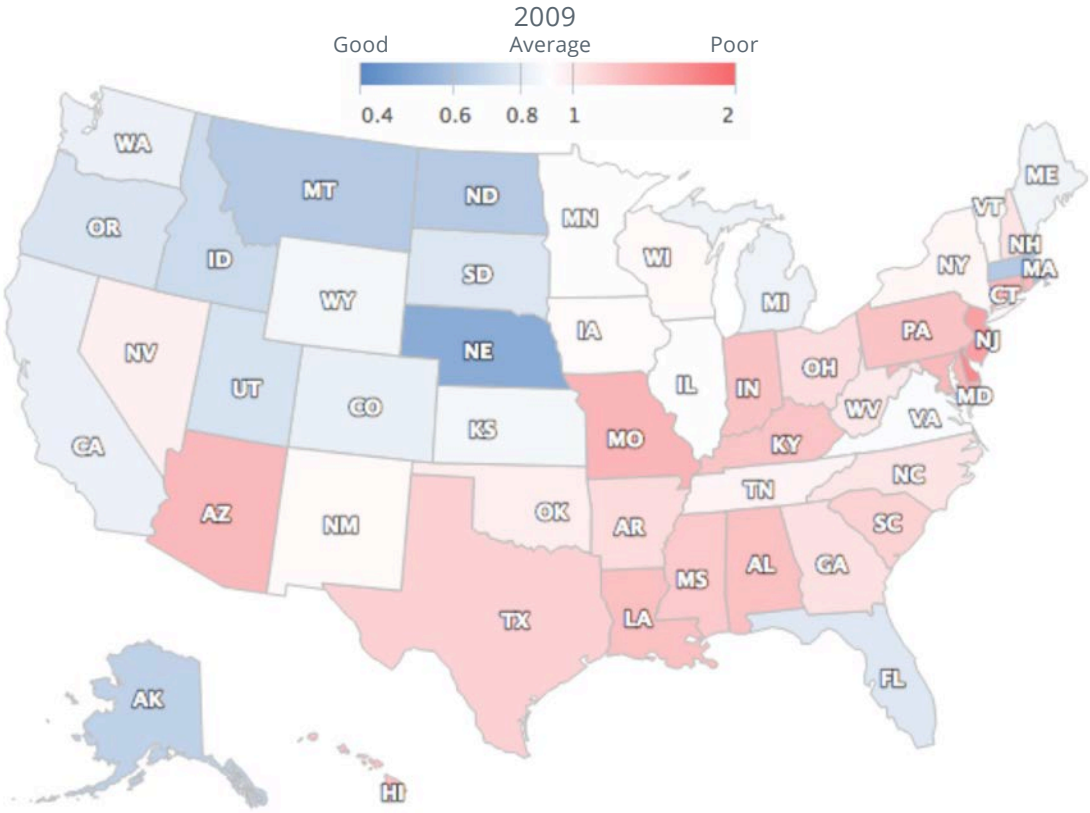


Figure 5. Annual NFIRS Data Quality by State Relative to National Average Data Quality Measure, 2009 to 2011



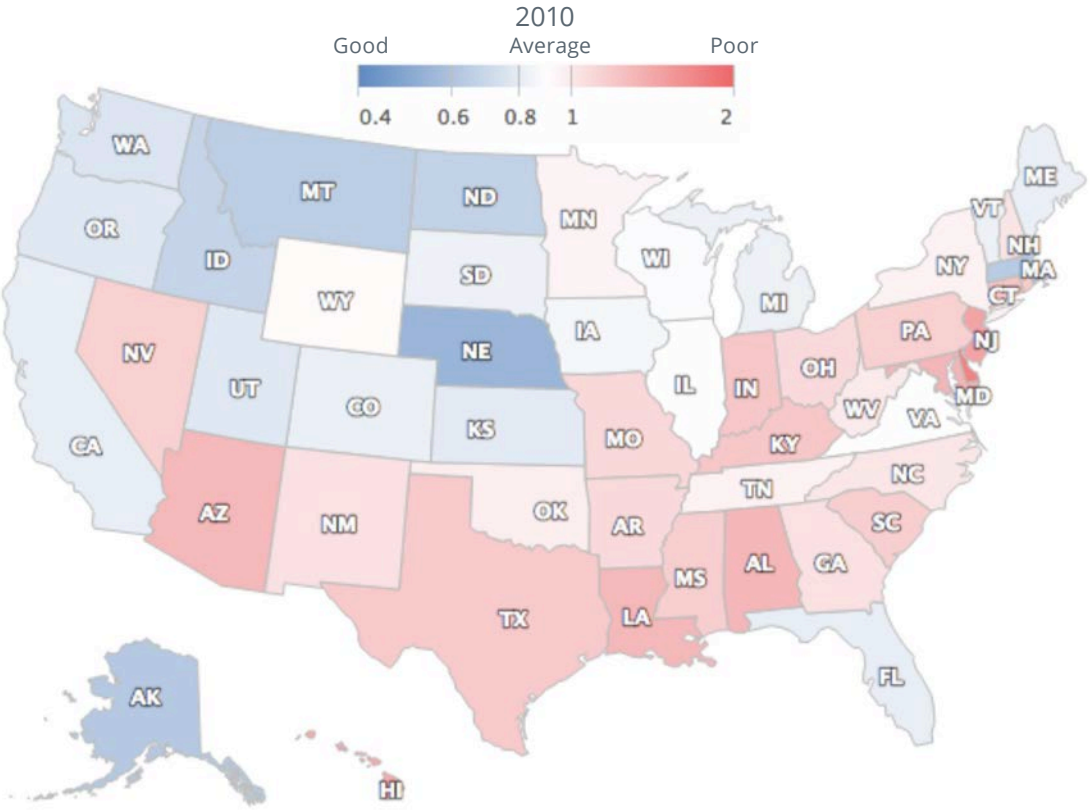
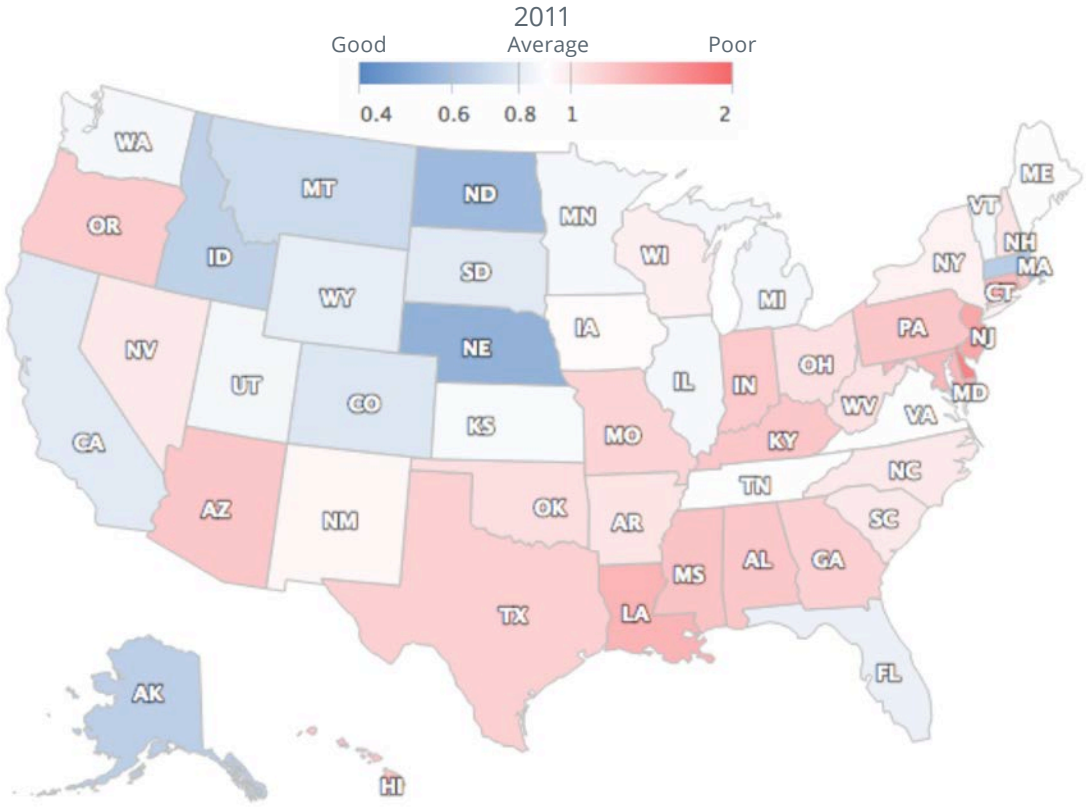


Figure 5. Annual NFIRS Data Quality by State Relative to National Average Data Quality Measure, 2009 to 2011 — continued



Data Quality of Key Data Elements

Although the NFIRS contains hundreds of data elements, only a few are used in producing the USFA's topical and analytic reports. Most of the elements used in the USFA's analyses are required to be completed for each fire incident type. For small confined fires, outside rubbish fires with no value, and other unclassified fires, however, only the most basic incident information is required.

A complete list of NFIRS data elements is documented in the "NFIRS 5.0 Complete Reference Guide."[21] Table 4 identifies the NFIRS data elements that are used most often in fire data analyses produced by the USFA. Not all types of fires require the same data elements. Table 4 displays the data elements and the data element's required completion by type of fire. Table 5 identifies the NFIRS data elements that are used most often in the analyses of casualties produced by the USFA. Because of the limited reporting required of confined fires and other unclassified fires, these fires are not included here or in the data quality tables that follow.

Incident type, incident date and alarm time are integral elements of the incident and are not subject to quality review: either these elements exist and are within valid ranges or the incident record is not accepted into the national fire database. Similarly, deaths, injuries, contents and property loss can only be "sanity checked" as there are not specific and definable correct entries, only "reasonable" ones. These elements are shown in the detailed tables as distributions. Content loss is only shown for buildings and mobile property structure fires.

[21]"NFIRS 5.0 Complete Reference Guide," USFA, January 2013: http://www.nfirs.fema.gov/documentation/reference/.

Four types of fires are defined for the purposes of data quality analysis. These fire types are largely based on the NFIRS modules that departments are required to complete.

- Nonbuilding structure fires (also called "special structure" fires) — Fires in or of structures that are not buildings or used as buildings, e.g. bridges or fences. For nonbuilding structure fires, the Fire Module and the first element in the Structure Fire Module are required.
- Buildings and mobile property structures — Fires in structures that are buildings or are in mobile properties that are used as structures, e.g. manufactured or mobile homes. For buildings and mobile property structure fires, both the Fire and Structure Fire Modules are required.
- Vehicle fires — Fires in vehicles or other mobile property, e.g., trucks, planes, trains. For vehicle fires, the Fire Module is required.
- Outside fires — Fires that occur outdoors that may be open, e.g., grass fires, crop fires, other vegetation fires, and the like. For outside fires, the Fire Module or the Wildland Fire Module is required.

Table 4. NFIRS Data Elements Used in USFA Analyses (Fires)

Data Element	Description	Required Data Element				
		All Fires[a]	Nonbuilding Structures	Buildings and Mobile Property Structures[b]	Vehicles	Outside[c]
Incident Type	The actual situation found on scene when emergency personnel arrived.	Yes	Yes	Yes	Yes	Yes
Property Use	The actual use of the property where the incident occurred, not the overall use of mixed-use properties of which the property is part.	Yes	Yes	Yes	Yes	Yes
Incident Date	The month, day and year of incident.	Yes	Yes	Yes	Yes	Yes
Alarm Time	The actual month, day, year and time of day (hour, minute and seconds) when the alarm was received by the fire department.	Yes	Yes	Yes	Yes	Yes
Deaths	A civilian fire death resulting from the incident, or during the mitigation of the incident (includes emergency personnel who are not part of the fire department, such as police officers or utility workers).	Yes	Yes	Yes	Yes	Yes

Table 4. NFIRS Data Elements Used in USFA Analyses (Fires) — continued

Data Element	Description	Required Data Element				
		All Fires[a]	Nonbuilding Structures	Buildings and Mobile Property Structures[b]	Vehicles	Outside[c]
Injuries	A civilian fire injury resulting from the incident, or during the mitigation of the incident (includes emergency personnel who are not part of the fire department, such as police officers or utility workers).	Yes	Yes	Yes	Yes	Yes
Property Loss	The total property dollar loss.	Yes	Yes	Yes	Yes	Yes
Contents Loss	The total property contents dollar loss.	Yes	Yes	Yes	Yes	Yes
Area of Fire Origin	The primary use of the area where the fire started within the property.	No[d]	Yes	Yes	Yes	Yes
Heat Source	The source of heat that ignited the first-ignited item to cause the fire.	No[d]	Yes	Yes	Yes	Yes
Item First Ignited	The use or configuration of the item or material first ignited by the heat source. The item that had sufficient volume or heat intensity to extend to uncontrolled or self-perpetuating fire.	No[d]	Yes	Yes	Yes	Yes
Cause of Ignition	General description of why the heat source and the combustible material were able to combine to initiate the fire. This is the best determination of the firefighter at the scene and may be changed later as a result of further investigation or other information.	No[d]	Yes	Yes	Yes	Yes
Factors Contributing to Ignition	The contributing factors that allowed the heat source and combustible material to combine to ignite the fire.	No[d]	Yes	Yes	Yes	Yes
Equipment Involved in Ignition	The piece of equipment that provided the principal heat source to cause the ignition if the equipment malfunctioned or was used improperly.	No	No	No	No	No
Fire Spread	The extent of fire spread in terms of how far the flame damage extended.	No	No	Yes	No	No
Presence of Detectors	The existence of fire detection equipment within its designed range of the fire.	No	No	Yes	No	No
Detector Operation	The operation and effectiveness of the detector relative to the area of fire origin.	No	No	No	No	No

Table 4. NFIRS Data Elements Used in USFA Analyses (Fires) — continued

Data Element	Description	Required Data Element				
		All Fires[a]	Nonbuilding Structures	Buildings and Mobile Property Structures[b]	Vehicles	Outside[c]
Detector Effectiveness	The effectiveness of the fire detection equipment in alerting occupants.	No	No	No	No	No
Presence of Automatic Extinguishing System (AES)	The existence of an AES within the AES's designed range of a fire.	No	No	Yes	No	No

Source: "NFIRS 5.0 Complete Reference Guide," USFA, January 2013.

Notes:
a. "All fires" includes small confined fires, outside rubbish fires with no value, and other unclassified fires which have less stringent reporting requirements.
b. "Buildings and mobile property structures" does not include confined building fires (small fires confined to the object of origin), as for these fires, only the most basic information about the incident is required.
c. "Outside" does not include outside rubbish fires (fires with no value) or other, unspecified fires, as for these fires, only the most basic information about the incident is required.
d. Area of fire origin, heat source, item first ignited, cause of ignition, and factors contributing to ignition are not required for small confined fires, outside rubbish fires with no value, and other unclassified fires, as these types of fires have less stringent reporting requirements.

Table 5. NFIRS Data Elements Used in USFA Analyses (Civilian Casualties)

Data Element	Description	Required Data
Gender	The gender of the injured person.	Yes
Age or Date of Birth	The casualty's age in years or, if the casualty is an infant, the age in months OR the month, day and year of birth of the casualty.	Yes
Race	The identification of the race of the casualty based on U.S. Office of Management and Budget (OMB) designations.	No
Ethnicity	Identifies the ethnicity of the casualty. Ethnicity is an ethnic classification or affiliation. Ethnicity designates a population subgroup having a common cultural heritage, as distinguished by customs, characteristics, language or common history, amongst other attributes. Currently, Hispanic/Latino is the only OMB designation for ethnicity.	No
Severity	The relative severity or seriousness of the injury on a scale from "least serious" (minor) to "most serious" (death).	Yes
Cause of Injury	The physical event that caused the injury.	No
Human Factors Contributing to Injury	The physical or mental state of the person before becoming a casualty.	No
Factors Contributing to Injury	The most significant factors contributing to the injury of the casualty.	No
Activity When Injured	The action or activity in which the person was engaged at the time of the injury.	No
Primary Apparent Symptom	The casualty's most serious apparent injury.	No
Primary Area of Body Injured	The part of the body that sustained the most serious injury.	No

Source: "NFIRS 5.0 Complete Reference Guide," USFA, January 2013.
Note: In the NFIRS paper forms and the NFIRS CRG, the full data element name is Age or Date of Birth; in the civilian fire casualty file in the PDR, the data element is Age. All other data elements retain their names in the PDR.

The National Fire Incident Reporting System Data Element Quality

In the sections that follow, data elements typically used in USFA analyses are assessed for overall data quality and usefulness for the period of 2009 to 2011. The first section is an overall summary of key data elements. The second section presents the detailed assessment by year, type of fire, and data element of the data quality and data usability of data elements commonly used in the USFA's NFIRS data analyses.

Summary Tables

In the summary tables that follow, data elements typically used in USFA analyses are assessed for overall data quality and usefulness for the period of 2009 to 2011. The summary tables are organized as follows:

- Table 6, by type of fire — nonbuilding structures, buildings and mobile property structures, vehicles, and outside fires. Detailed breakouts of these summary tables by type of fire and year are found in Table 9 through Table 12.
- Table 7, fires with casualties — by type of casualty (deaths, injuries) and general type of fire (all fires or building and mobile property fire where the majority of fire casualties occur). Detailed breakouts of these summary tables by type of fire and year are found in Table 13, Table 15, Table 17 and Table 19.
- Table 8, by type of casualty and general type of fire (all fires or building and mobile property fire where the majority of fire casualties occur). Detailed breakouts of these summary tables by type of fire and year are found in Table 23 through Table 26.

Data quality for each data element is indexed on the total proportion of valid entries for that element. Data usability for each data element is indexed on the proportion of valid known entries for that element. Both have a maximum value of 100. Ranges of these indices are shown rather than averages. It is possible that a data element has a high data element quality index but a moderate data element usability index — while entries are valid and complete, the difference in the indices reflects the amount of data coded as unknown.

Required data elements, shown in Table 4, have an overall data quality index that is either a perfect value of 100 or very near. The exceptions are outside fires, all fires with injuries, and the presence of detectors and automatic extinguishing systems in fires other than buildings and mobile property structures. Incident data for many types of outside fires can be reported via the Wildland Module in lieu of the Fire Module. The Wildland Module does not have the full set of required data elements contained in the Fire Module. As a result, many required Fire Module data elements have no entries. The overall result is a lower data quality index.

A similar situation occurs with the data quality for fires with injuries. Fire injuries occur frequently and across all types of fires. The data quality index is in the low 90s because of the number of injuries that occur in outside and other fires where alternate reporting methods are allowed and reporting requirements are somewhat less stringent. In addition, determining many of the fire-related data elements for outside fires is difficult because of the nature of the fires.

The lower data quality index for the presence of detectors and AESs in fires other than buildings and mobile property structures is a result of deaths and injuries in incidents, such as vehicle and outside fires, where the Structure Module is not required (these data variables only apply to buildings and mobile structures).

Table 6. Data Element Quality and Usability Summary for Common NFIRS Data Elements Type of Fire, 2009 to 2011

Data Element	Type of Fire							
	Nonbuilding Structure		Buildings and Mobile Property Structure		Vehicle		Outside	
	Quality Index Range	Usability Index Range	Quality Index Range	Usability Index Range	Quality Index Range	Usability Index Range	Quality Index Range	Usability Index Range
Property Use	100.0	99.2 - 99.5	100.0	99.3 - 99.4	100.0	98.4 - 98.6	100.0	98.1 - 98.5
Area of Fire Origin	100.0	84.6 - 84.9	100.0	86.3 - 86.5	100.0	86.2 - 86.3	77.4 - 79.8	63.4 - 65.7
Heat Source	100.0	64.6 - 65.0	100.0	62.8 - 63.7	100.0	49.4 - 49.6	90.1 - 91.1	45.2 - 47.7
Item First Ignited	100.0	64.1 - 64.6	100.0	62.6 - 63.3	100.0	41.6 - 43.5	77.4 - 79.7	50.7 - 53.8
Cause of Ignition	100.0	82.7 - 84.2	100.0	86.4 - 86.6	100.0	77.7 - 78.0	99.9 - 100.0	68.6 - 69.6
Factors Contributing to Ignition	100.0	73.6 - 74.4	100.0	73.0 - 73.4	100.0	70.1 - 70.2	87.5 - 88.6	64.7 - 65.5
Equipment Involved in Ignition	36.1 - 40.9	35.4 - 40.2	41.6 - 42.7	40.3 - 41.4	27.9 - 29.3	27.6 - 28.9	26.4 - 27.2	25.3 - 26.3
Fire Spread	–	–	94.7 - 95.4	94.7 - 95.4	–	–	–	–
Presence of Detectors	–	–	95.4 - 95.6	68.7 - 69.2	–	–	–	–
Detector Operation	–	–	100.0	81.3 - 83.2	–	–	–	–
Detector Effectiveness	–	–	100.0	90.2 - 90.5	–	–	–	–
Presence of AES	–	–	95.1 - 95.2	86.6 - 86.8	–	–	–	–

Table 7. Data Element Quality and Usability Summary for Common NFIRS Data Elements Type of Fire With Deaths or Injuries, 2009 to 2011

Data Element	Type of Fire							
	Fatal Fires		Fatal Fires in Buildings and Mobile Property Structure		Fires with Injuries		Buildings and Mobile Property Structure Fires with Injuries	
	Quality Index Range	Usability Index Range	Quality Index Range	Usability Index Range	Quality Index Range	Usability Index Range	Quality Index Range	Usability Index Range
Property Use	100.0	99.4 - 99.8	100.0	99.8 - 99.8	100.0	99.5 - 99.6	100.0	99.4 - 99.6
Area of Fire Origin	99.2 - 99.5	79.1 - 79.5	100.0	79.9 - 80.4	90.6 - 91.9	85.9 - 86.8	100.0	94.0 - 94.4
Heat Source	99.1 - 99.5	43.3 - 44.3	100.0	42.9 - 43.3	90.6 - 91.9	66.2 - 67.7	100.0	71.4 - 72.4
Item First Ignited	99.1 - 99.5	43.1 - 45.3	100.0	42.3 - 45.2	90.6 - 91.9	65.4 - 66.1	99.9 - 100.0	70.6 - 71.6
Cause of Ignition	99.1 - 99.5	85.6 - 87.0	100.0	86.1 - 86.8	90.6 - 92.0	83.2 - 84.8	100.0	91.9 - 92.0
Factors Contributing to Ignition	99.2 - 99.5	54.5 - 56.4	100.0	51.4 - 54.9	90.6 - 91.9	70.2 - 71.4	100.0	75.4 - 77.1
Equipment Involved in Ignition	36.5 - 38.8	34.0 - 36.6	38.8 - 42.0	35.9 - 39.3	43.3 - 44.5	42.1 - 43.6	48.3 - 49.4	46.8 - 48
Fire Spread	78.5 - 79.2	78.5 - 79.2	97.9 - 98.2	97.9 - 98.2	71.0 - 74.6	71.0 - 74.6	98.6 - 98.7	98.6 - 98.7
Presence of Detectors	78.7 - 79.5	46.6 - 48.7	98.2 - 98.4	58.3 - 60.1	71.3 - 74.7	54.5 - 58.2	98.7 - 98.8	75.3 - 77.1
Detector Operation	100.0	61.3 - 65.5	100.0	61.4 - 65.5	100.0	81.0 - 85.5	100.0	80.3 - 85.0
Detector Effectiveness	100.0	65.8 - 68.4	62.0 - 71.2	42.3 - 46.8	100.0	87.8 - 88.9	100.0	87.3 - 88.5
Presence of AES	78.5 - 79.2	71.6 - 72.3	97.8 - 98.3	89.4 - 90.1	71.0 - 74.3	68.7 - 71.4	98.1 - 98.5	94.4 - 95.5

Table 8. Data Element Quality and Usability Summary for Common NFIRS Data Elements Type of Casualty With Deaths or Injuries, 2009 to 2011

Data Element	Type of Casualty							
	Deaths in All Fires		Deaths in Buildings and Mobile Property Structures		Injuries in All Fires		Injuries in Buildings and Mobile Property Structures	
	Quality Index Range	Usability Index Range	Quality Index Range	Usability Index Range	Quality Index Range	Usability Index Range	Quality Index Range	Usability Index Range
Gender	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Age or Date of Birth	97.7 - 98.5	97.7 - 98.5	98.4 - 98.8	98.4 - 98.8	97.7 - 98.2	97.7 - 98.2	97.6 - 98.0	97.6 - 98.0
Race	62.3 - 64.6	58.4 - 60.6	64.8 - 66.5	61.8 - 63.4	57.2 - 60.0	53.7 - 56.4	56.7 - 60.0	53.1 - 56.4
Ethnicity	39.4 - 42.9	39.4 - 42.9	41.0 - 44.5	41.0 - 44.5	39.6 - 42.0	39.6 - 42.0	39.5 - 42.1	39.5 - 42.1
Severity	100.0	100.0	100.0	100.0	100.0	95.9 - 96.3	100.0	95.7 - 96.3
Cause of Injury	70.1 - 72.3	57.3 - 60.2	70.4 - 73.1	57.9 - 60.9	74.4 - 75.7	71.7 - 73.5	73.6 - 75.8	70.8 - 73.4
Human Factors Contributing to Injury	53.4 - 55.4	53.4 - 55.4	53.4 - 57.6	53.4 - 57.6	59.5 - 60.8	59.5 - 60.8	58.5 - 60.2	58.5 - 60.2
Factors Contributing to Injury	43.1 - 48.0	43.1 - 48.0	41.2 - 47.7	41.2 - 47.7	49.4 - 52.3	49.4 - 52.2	48.6 - 51.5	48.6 - 51.4
Activity When Injured	53.7 - 54.4	31.1 - 32.8	55.0 - 56.2	31.7 - 34.4	65.8 - 67.4	58.1 - 59.9	65.0 - 67.8	57.6 - 60.5
Primary Apparent Symptom	53.3 - 54.9	45.0 - 45.7	54.1 - 57.2	46.3 - 48.1	64.8 - 68.8	63.7 - 67.6	64.9 - 69.6	63.7 - 68.2
Primary Area of Body Injured	47.8 - 50.1	47.8 - 50.1	47.3 - 51.7	47.3 - 51.7	58.1 - 60.6	58.1 - 60.6	57.9 - 60.7	57.9 - 60.6

Note: In the NFIRS paper forms and the NFIRS CRG, the full data element name is Age or Date of Birth; in the civilian fire casualty file in the PDR, the data element is Age.

Detailed Data Quality and Usability of Commonly Used Data Elements in Analyses

The following tables present the detailed assessment of data quality and data usability of data elements commonly used in the USFA's NFIRS data analyses. For coded data elements, four data quality measures are assessed based on the proportion of fires that fall under the measure for the data element in question. These measures are:

- Valid known — The number/percent of data element entries that are valid according to the NFIRS CRG.
- Valid unknown — The number/percent of data element entries that are coded as unknown ("U," "UU" or "UUU"), where unknown is a valid entry according to the NFIRS CRG.
- Invalid — The number/percent of data element entries whose entries are not valid according to the NFIRS CRG.
- Null or no entry — The number of entries where no data has been entered whether or not the data element is required to be completed.

The two quality indices, data element quality and data element usability, are also included in each of these tables. As noted earlier, it is possible that a data element with a high data quality index may have a moderate, or even low, usability index. For example, in Table 9 the data element "heat source" has a data quality index of 100.0 — all entries in heat source for nonbuilding fires are valid entries, whether the actual heat source is explicitly specified or it is coded as "unknown." The usability index, however, is 64.6 because a very large proportion of those entries are coded as "unknown," making definitive analyses using this data element problematic.

For data elements that have direct entry, specifically dollar losses and numbers of casualties, distributions of entries are shown.

Table 9 through Table 12 are detailed breakouts by year of common NFIRS data elements by the four major types of fire. These tables are also summarized in Table 6.

Table 13 through Table 20 are paired tables of detailed breakouts by year of common NFIRS data elements for fires with casualties by type of casualty (deaths, injuries) and general type of fire (all fires or building and mobile property fire). Each detailed table is followed by a distribution of the number of casualties (e.g., reported deaths or injuries) by year. The detailed tables are also summarized in Table 7.

Table 21 is the distribution of reported property loss by year for each of the four major fire types.

Table 22 is the distribution of reported content loss by year for building and mobile property structure fires, where content losses are typically found.

Table 23 through Table 26 are detailed breakouts by year of common NFIRS data elements for reported casualties (deaths, injuries) by general type of fire (all fires or building and mobile property fire). These tables are also summarized in Table 8.

Table 9. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Nonbuilding Structure Fires, 2009 to 2011

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2009							
Property Use	8,254	8,213	41	0	0	100.0	99.5
Percent	100.0	99.5	0.5	0.0	0.0		
Area of Fire Origin	8,254	6,979	1,275	0	0	100.0	84.6
Percent	100.0	84.6	15.4	0.0	0.0		
Heat Source	8,254	5,334	2,920	0	0	100.0	64.6
Percent	100.0	64.6	35.4	0.0	0.0		
Item First Ignited	8,254	5,330	2,924	0	0	100.0	64.6
Percent	100.0	64.6	35.4	0.0	0.0		
Cause of Ignition	8,254	6,825	1,429	0	0	100.0	82.7
Percent	100.0	82.7	17.3	0.0	0.0		
Factors Contributing to Ignition	8,254	6,072	2,179	0	3	100.0	73.6
Percent	100.0	73.6	26.4	0.0	0.0		
Equipment Involved in Ignition	8,254	3,320	60	0	4,874	40.9	40.2
Percent	100.0	40.2	0.7	0.0	59.1		
2010							
Property Use	9,381	9,311	70	0	0	100.0	99.3
Percent	100.0	99.3	0.7	0.0	0.0		
Area of Fire Origin	9,381	7,947	1,434	0	0	100.0	84.7
Percent	100.0	84.7	15.3	0.0	0.0		
Heat Source	9,381	6,100	3,281	0	0	100.0	65.0
Percent	100.0	65.0	35.0	0.0	0.0		
Item First Ignited	9,381	6,010	3,371	0	0	100.0	64.1
Percent	100.0	64.1	35.9	0.0	0.0		

Table 9. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Nonbuilding Structure Fires, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Cause of Ignition	9,381	7,841	1,540	0	0	100.0	83.6
Percent	100.0	83.6	16.4	0.0	0.0		
Factors Contributing to Ignition	9,381	6,984	2,397	0	0	100.0	74.4
Percent	100.0	74.4	25.6	0.0	0.0		
Equipment Involved in Ignition	9,381	3,454	88	0	5,839	37.7	36.8
Percent	100.0	36.8	0.9	0.0	62.2		
2011							
Property Use	9,996	9,918	78	0	0	100.0	99.5
Percent	100.0	99.2	0.8	0.0	0.0		
Area of Fire Origin	9,996	8,486	1,510	0	0	100.0	84.6
Percent	100.0	84.9	15.1	0.0	0.0		
Heat Source	9,996	6,479	3,517	0	0	100.0	64.6
Percent	100.0	64.8	35.2	0.0	0.0		
Item First Ignited	9,996	6,422	3,574	0	0	100.0	64.6
Percent	100.0	64.2	35.8	0.0	0.0		
Cause of Ignition	9,996	8,413	1,583	0	0	100.0	82.7
Percent	100.0	84.2	15.8	0.0	0.0		
Factors Contributing to Ignition	9,996	7,361	2,635	0	0	100.0	73.6
Percent	100.0	73.6	26.4	0.0	0.0		
Equipment Involved in Ignition	9,996	3,541	73	0	6,382	36.1	40.2
Percent	100.0	35.4	0.7	0.0	63.8		

Source: NFIRS.

Note: a. Valid unknown entries are coded as "U," "UU" or "UUU" (depending on the field length). These coded values are distinctly different from blanks and no entries as the lack of information only implies that the information was not given and does not imply that the element is truly "unknown."

Table 10. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Buildings and Mobile Property Structure Fires[22], 2009 to 2011

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2009							
Property Use	167,249	166,258	991	0	0	100.0	99.4
Percent	100.0	99.4	0.6	0.0	0.0		
Area of Fire Origin	167,249	144,258	22,986	0	5	100.0	86.3
Percent	100.0	86.3	13.7	0.0	0.0		
Heat Source	167,249	104,991	62,253	0	5	100.0	62.8
Percent	100.0	62.8	37.2	0.0	0.0		
Item First Ignited	167,249	105,813	61,431	0	5	100.0	63.3
Percent	100.0	63.3	36.7	0.0	0.0		
Cause of Ignition	167,249	144,432	22,812	0	5	100.0	86.4
Percent	100.0	86.4	13.6	0.0	0.0		
Factors Contributing to Ignition	167,249	122,202	45,036	0	11	100.0	73.1
Percent	100.0	73.1	26.9	0.0	0.0		
Equipment Involved in Ignition	167,249	69,307	2,216	0	95,726	42.7	41.4
Percent	100.0	41.4	1.3	0.0	57.2		
Fire Spread	167,249	158,389	0	0	8,860	94.7	94.7
Percent	100.0	94.7	0.0	0.0	5.3		
Presence of Detectors	167,249	114,842	44,631	0	7,776	95.4	68.7
Percent	100.0	68.7	26.7	0.0	4.6		
Detector Operation (when present)	59,248	48,140	11,108	0	0	100.0	81.3
Percent	100.0	81.3	18.7	0.0	.00		

[22]Does not include confined building fires (small fires confined to the object of origin), as for these fires, only the most basic information about the incident is required.

Table 10. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Buildings and Mobile Property Structure Fires, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Detector Effectiveness (when present and operating)	34,059	30,726	3,333	0	0	100.0	90.2
Percent	100.0	90.2	9.8	0.0	0.0		
Presence of AES	167,249	144,790	14,134	0	8,325	95.1	86.6
Percent	100.0	86.6	8.5	0.0	5.0		
2010							
Property Use	187,711	186,469	1,242	0	0	100.0	99.3
Percent	100.0	99.3	0.7	0.0	0.0		
Area of Fire Origin	187,711	162,375	25,327	0	9	100.0	86.5
Percent	100.0	86.5	13.5	0.0	0.0		
Heat Source	187,711	119,575	68,127	0	9	100.0	63.7
Percent	100.0	63.7	36.3	0.0	0.0		
Item First Ignited	187,711	118,632	69,062	0	17	100.0	63.2
Percent	100.0	63.2	36.8	0.0	0.0		
Cause of Ignition	187,711	162,602	25,092	0	17	100.0	86.6
Percent	100.0	86.6	13.4	0.0	0.0		
Factors Contributing to Ignition	187,711	137,805	49,893	0	13	100.0	73.4
Percent	100.0	73.4	26.6	0.0	0.0		
Equipment Involved in Ignition	187,711	75,692	2,382	0	109,637	41.6	40.3
Percent	100.0	40.3	1.3	0.0	58.4		
Fire Spread	187,711	178,380	0	0	9,331	95.0	95.0
Percent	100.0	95.0	0.0	0.0	5.0		
Presence of Detectors	187,711	129,825	49,128	0	8,758	95.4	69.2
Percent	100.0	69.2	26.2	0.0	4.7		

Table 10. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Buildings and Mobile Property Structure Fires, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Detector Operation (when present)	68,466	56,956	11,507	0	3	100.0	83.2
Percent	100.0	83.2	16.8	0.0	0.0		
Detector Effectiveness (when present and operating)	39,608	35,836	3,770	0	2	100.0	90.5
Percent	100.0	90.5	9.5	0.0	0.0		
Presence of AES	187,711	162,868	15,551	0	9,292	95.1	86.8
Percent	100.0	86.8	8.3	0.0	5.0		
2011							
Property Use	188,976	187,852	1,123	1	0	100.0	99.4
Percent	100.0	99.4	0.6	0.0	0.0		
Area of Fire Origin	188,976	163,235	25,740	0	1	100.0	86.4
Percent	100.0	86.4	13.6	0.0	0.0		
Heat Source	188,976	119,536	69,439	0	1	100.0	63.3
Percent	100.0	63.3	36.7	0.0	0.0		
Item First Ignited	188,976	118,283	70,692	0	1	100.0	62.6
Percent	100.0	62.6	37.4	0.0	0.0		
Cause of Ignition	188,976	163,557	25,418	0	1	100.0	86.5
Percent	100.0	86.5	13.5	0.0	0.0		
Factors Contributing to Ignition	188,976	137,993	50,979	0	4	100.0	73.0
Percent	100.0	73.0	27.0	0.0	0.0		
Equipment Involved in Ignition	188,976	76,291	2,267	0	110,418	41.6	40.4
Percent	100.0	40.4	1.2	0.0	58.4		
Fire Spread	188,976	180,321	0	0	8,655	95.4	95.4
Percent	100.0	95.4	0.0	0.0	4.6		

Table 10. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Buildings and Mobile Property Structure Fires, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Presence of Detectors	188,976	130,179	50,391	0	8,406	95.6	68.9
Percent	100.0	68.9	26.7	0.0	4.4		
Detector Operation (when present)	69,324	57,689	11,634	0	1	100.0	83.2
Percent	100.0	83.2	16.8	0.0	0.0		
Detector Effectiveness (when present and operating)	40,302	36,380	3,922	0	0	100.0	90.3
Percent	100.0	90.3	9.7	0.0	0.0		
Presence of AES	188,976	163,858	16,131	0	8,987	95.2	86.7
Percent	100.0	86.7	8.5	0.0	4.8		

Source: NFIRS.

Note: a. Valid unknown entries are entries coded as "U," "UU" or "UUU" (depending on the field length). These coded values are distinctly different from blanks and no entries as the lack of information only implies that the information was not given and does not imply that the element is truly "unknown."

Table 11. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Vehicle Fires, 2009 to 2011

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2009							
Property Use	149,471	147,006	2,465	0	0	100.0	98.4
Percent	100.0	98.4	1.6	0.0	0.0		
Area of Fire Origin	149,471	128,922	20,548	0	1	100.0	86.3
Percent	100.0	86.3	13.7	0.0	0.0		
Heat Source	149,471	74,076	75,394	0	1	100.0	49.6
Percent	100.0	49.6	50.4	0.0	0.0		
Item First Ignited	149,471	64,987	84,483	0	1	100.0	43.5
Percent	100.0	43.5	56.5	0.0	0.0		
Cause of Ignition	149,471	116,136	33,334	0	1	100.0	77.7
Percent	100.0	77.7	22.3	0.0	0.0		
Factors Contributing to Ignition	149,471	104,722	44,744	0	5	100.0	70.1
Percent	100.0	70.1	29.9	0.0	0.0		
Equipment Involved in Ignition	149,471	43,260	585	0	105,626	29.3	28.9
Percent	100.0	28.9	0.4	0.0	70.7		
2010							
Property Use	155,267	152,854	2,412	1	0	100.0	98.4
Percent	100.0	98.4	1.6	0.0	0.0		
Area of Fire Origin	155,267	133,863	21,400	0	4	100.0	86.2
Percent	100.0	86.2	13.8	0.0	0.0		
Heat Source	155,267	76,749	78,514	0	4	100.0	49.4
Percent	100.0	49.4	50.6	0.0	0.0		
Item First Ignited	155,267	65,395	89,859	0	13	100.0	42.1
Percent	100.0	42.1	57.9	0.0	0.0		

Table 11. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Vehicle Fires, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Cause of Ignition	155,267	120,795	34,457	2	13	100.0	77.8
Percent	100.0	77.8	22.2	0.0	0.0		
Factors Contributing to Ignition	155,267	109,026	46,231	0	10	100.0	70.2
Percent	100.0	70.2	29.8	0.0	0.0		
Equipment Involved in Ignition	155,267	42,792	508	0	111,967	27.9	27.6
Percent	100.0	27.6	0.3	0.0	72.1		
2011							
Property Use	149,333	147,178	2,155	0	0	100.0	98.6
Percent	100.0	98.6	1.4	0.0	0.0		
Area of Fire Origin	149,333	128,838	20,495	0	0	100.0	86.3
Percent	100.0	86.3	13.7	0.0	0.0		
Heat Source	149,333	73,884	75,449	0	0	100.0	49.5
Percent	100.0	49.5	50.5	0.0	0.0		
Item First Ignited	149,333	62,185	87,148	0	0	100.0	41.6
Percent	100.0	41.6	58.4	0.0	0.0		
Cause of Ignition	149,333	116,504	32,829	0	0	100.0	78.0
Percent	100.0	78.0	22.0	0.0	0.0		
Factors Contributing to Ignition	149,333	104,707	44,625	0	1	100.0	70.1
Percent	100.0	70.1	29.9	0.0	0.0		
Equipment Involved in Ignition	149,333	42,343	456	0	106,534	28.7	28.4
Percent	100.0	28.4	0.3	0.0	71.3		

Source: NFIRS.

Note: a. Valid unknown entries are coded as "U," "UU" or "UUU" (depending on the field length). These coded values are distinctly different from blanks and no entries as the lack of information only implies that the information was not given and does not imply that the element is truly "unknown."

Table 12. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Outside[23] Fires, 2009 to 2011

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2009							
Property Use	234,258	229,872	4,386	0	0	100.0	98.1
Percent	100.0	98.1	1.9	0.0	0.0		
Area of Fire Origin[b]	234,258	153,255	30,992	0	50,011	78.6	65.4
Percent	100.0	65.4	13.2	0.0	21.3		
Heat Source	234,258	111,835	100,183	0	22,240	90.5	47.7
Percent	100.0	47.7	42.8	0.0	9.5		
Item First Ignited[b]	234,258	125,985	58,262	0	50,011	78.7	53.8
Percent	100.0	53.8	24.9	0.0	21.3		
Cause of Ignition[c]	234,258	163,149	71,081	0	28	99.9	69.6
Percent	100.0	69.6	30.3	0.0	0.0		
Factors Contributing to Ignition	234,258	153,410	51,566	0	29,282	87.5	65.5
Percent	100.0	65.5	22.0	0.0	12.5		
Equipment Involved in Ignition	234,258	59,328	2,684	3	172,243	26.4	25.3
Percent	100.0	25.3	1.1	0.0	73.5		
2010							
Property Use	257,951	253,969	3,982	0	0	100.0	98.5
Percent	100.0	98.5	1.5	0.0	0.0		
Area of Fire Origin[b]	257,951	169,366	36,261	0	52,324	79.8	65.7
Percent	100.0	65.7	14.1	0.0	20.3		
Heat Source	257,951	116,539	118,306	0	23,106	91.1	45.2
Percent	100.0	45.2	45.9	0.0	9.0		
Item First Ignited[b]	257,951	135,430	70,187	0	52,334	79.7	52.5
Percent	100.0	52.5	27.2	0.0	20.3		

[23]Does not include outside rubbish fires (fires with no value) or other, unspecified fires, as for these fires, only the most basic information about the incident is required.

Table 12. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Outside Fires, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Cause of Ignition[c]	257,951	176,886	81,018	1	46	100.0	68.6
Percent	100.0	68.6	31.4	0.0	0.0		
Factors Contributing to Ignition	257,951	168,525	60,224	0	29,202	88.6	65.3
Percent	100.0	65.3	23.3	0.0	11.3		
Equipment Involved in Ignition	257,951	67,968	2,225	4	187,754	27.2	26.3
Percent	100.0	26.3	0.9	0.0	72.8		
2011							
Property Use	274,379	269,651	4,727	1	0	100.0	98.3
Percent	100.0	98.3	1.7	0.0	0.0		
Area of Fire Origin[b]	274,379	174,031	38,319	0	62,029	77.4	63.4
Percent	100.0	63.4	14.0	0.0	22.6		
Heat Source	274,379	124,467	122,550	0	27,362	90.1	45.4
Percent	100.0	45.4	44.7	0.0	10.0		
Item First Ignited[b]	274,379	139,019	73,331	0	62,029	77.4	50.7
Percent	100.0	50.7	26.7	0.0	22.6		
Cause of Ignition[c]	274,379	188,816	85,562	0	1	100.0	68.8
Percent	100.0	68.8	31.2	0.0	0.0		
Factors Contributing to Ignition	274,379	177,608	62,812	0	33,959	87.6	64.7
Percent	100.0	64.7	22.9	0.0	12.4		
Equipment Involved in Ignition	274,379	71,994	2,007	4	200,374	26.9	26.2
Percent	100.0	26.2	0.7	0.0	73		

Source: NFIRS.

Notes: a. Valid unknown entries are coded as "U," "UU" or "UUU" (depending on the field length). These coded values are distinctly different from blanks and no entries as the lack of information only implies that the information was not given and does not imply that the element is truly "unknown."

b. For vegetation, crop and other specific types of outside fires, data can be reported via the Fire or Wildland Fire Modules. Area of fire origin and item first ignited are found in the Fire Module only.

c. For vegetation, crop and other specific types of outside fires, data can be reported via the Fire or Wildland Fire Modules. The general cause data element is cause of ignition in the Fire Module and wildland fire cause in the Wildland Fire Module.

Table 13. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fatal Fires, 2009 to 2011

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2009							
Property Use	1,512	1,508	4	0	0	100.0	99.7
Percent	100.0	99.7	0.3	0.0	0.0		
Area of Fire Origin	1,512	1,199	306	0	7	99.5	79.3
Percent	100.0	79.3	20.2	0.0	0.5		
Heat Source	1,512	670	835	0	7	99.5	44.3
Percent	100.0	44.3	55.2	0.0	0.5		
Item First Ignited	1,512	685	820	0	7	99.5	45.3
Percent	100.0	45.3	54.2	0.0	0.5		
Cause of Ignition	1,512	1,316	189	0	7	99.5	87
Percent	100.0	87.0	12.5	0.0	0.5		
Factors Contributing to Ignition	1,512	853	652	0	7	99.5	56.4
Percent	100.0	56.4	43.1	0.0	0.5		
Equipment Involved in Ignition	1,512	554	33	0	925	38.8	36.6
Percent	100.0	36.6	2.2	0.0	61.2		
Fire Spread	1,512	1,189	0	0	323	78.6	78.6
Percent	100.0	78.6	0.0	0.0	21.4		
Presence of Detectors	1,512	708	486	0	318	78.9	46.8
Percent	100.0	46.8	32.1	0.0	21		
Detector Operation (when present)	424	275	149	0	0	100.0	64.9
Percent	100.0	64.9	35.1	0.0	0.0		
Detector Effectiveness (when present and operating)	170	116	54	0	0	100.0	68.2
Percent	100.0	68.2	31.8	0.0	0.0		

Table 13. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fatal Fires, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Presence of AES	1,512	1,083	105	0	324	78.5	71.6
Percent	100.0	71.6	6.9	0.0	21.4		
2010							
Property Use	1,637	1,627	10	0	0	100.0	99.4
Percent	100.0	99.4	0.6	0.0	0.0		
Area of Fire Origin	1,637	1,301	322	0	14	99.2	79.5
Percent	100.0	79.5	19.7	0.0	0.9		
Heat Source	1,637	726	897	0	14	99.1	44.3
Percent	100.0	44.3	54.8	0.0	0.9		
Item First Ignited	1,637	706	917	0	14	99.1	43.1
Percent	100.0	43.1	56.0	0.0	0.9		
Cause of Ignition	1,637	1,402	221	0	14	99.1	85.6
Percent	100.0	85.6	13.5	0.0	0.9		
Factors Contributing to Ignition	1,637	892	731	0	14	99.2	54.5
Percent	100.0	54.5	44.7	0.0	0.9		
Equipment Involved in Ignition	1,637	557	41	0	1,039	36.5	34.0
Percent	100.0	34.0	2.5	0.0	63.5		
Fire Spread	1,637	1,296	0	0	341	79.2	79.2
Percent	100.0	79.2	0.0	0.0	20.8		
Presence of Detectors	1,637	798	505	0	334	79.5	48.7
Percent	100.0	48.7	30.8	0.0	20.4		
Detector Operation (when present)	481	295	186	0	0	100.0	61.3
Percent	100.0	61.3	38.7	0.0	0.0		

Table 13. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fatal Fires, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Detector Effectiveness (when present and operating)	193	132	61	0	0	100.0	68.4
Percent	100.0	68.4	31.6	0.0	0.0		
Presence of AES	1,637	1,183	113	0	341	79.2	72.3
Percent	100.0	72.3	6.9	0.0	20.8		
2011							
Property Use	1,690	1,686	4	0	0	100.0	99.8
Percent	100.0	99.8	0.2	0.0	0.0		
Area of Fire Origin	1,690	1,337	342	0	11	99.3	79.1
Percent	100.0	79.1	20.2	0.0	0.7		
Heat Source	1,690	731	948	0	11	99.4	43.3
Percent	100.0	43.3	56.1	0.0	0.7		
Item First Ignited	1,690	728	951	0	11	99.4	43.1
Percent	100.0	43.1	56.3	0.0	0.7		
Cause of Ignition	1,690	1,458	221	0	11	99.4	86.3
Percent	100.0	86.3	13.1	0.0	0.7		
Factors Contributing to Ignition	1,690	929	750	0	11	99.4	55.0
Percent	100.0	55.0	44.4	0.0	0.7		
Equipment Involved in Ignition	1,690	606	35	0	1,049	38.0	35.9
Percent	100.0	35.9	2.1	0.0	62.1		
Fire Spread	1,690	1,327	0	0	363	78.5	78.5
Percent	100.0	78.5	0.0	0.0	21.5		
Presence of Detectors	1,690	788	542	0	360	78.7	46.6
Percent	100.0	46.6	32.1	0.0	21.3		

Table 13. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fatal Fires, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Detector Operation (when present)	478	313	165	0	0	100.0	65.5
Percent	100.0	65.5	34.5	0.0	0.0		
Detector Effectiveness (when present and operating)	222	146	76	0	0	100.0	65.8
Percent	100.0	65.8	34.2	0.0	0.0		
Presence of AES	1,690	1,217	112	0	361	78.6	72.0
Percent	100.0	72.0	6.6	0.0	21.4		

Source: NFIRS.

Note: a. Valid unknown entries are coded as "U," "UU" or "UUU" (depending on the field length). These coded values are distinctly different from blanks and no entries as the lack of information only implies that the information was not given and does not imply that the element is truly "unknown."

Table 14. Data Quality for Common NFIRS Data Elements Used in USFA Analyses Distribution of Fatal Fires by Reported Deaths, 2009 to 2011

Deaths per Incident	2009		2010		2011	
	Fires	Percent	Fires	Percent	Fires	Percent
1	1,284	84.9	1,409	86.1	1,480	87.6
2	172	11.4	164	10.0	148	8.8
3	36	2.4	37	2.3	36	2.1
4	10	0.7	13	0.8	13	0.8
5	8	0.5	9	0.5	7	0.4
More than 5	2	0.1	5	0.3	6	0.4
Total fires	1,512	100.0	1,637	100.0	1,690	100.0

Source: NFIRS.

Note: Total for 2011 does not add up to 100 percent due to rounding.

Table 15. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Buildings[24] and Mobile Property Structure Fatal Fires, 2009 to 2011

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2009							
Property Use	1,206	1,203	3	0	0	100.0	99.8
Percent	100.0	99.8	0.2	0.0	0.0		
Area of Fire Origin	1,206	966	240	0	0	100.0	80.1
Percent	100.0	80.1	19.9	0.0	0.0		
Heat Source	1,206	522	684	0	0	100.0	43.3
Percent	100.0	43.3	56.7	0.0	0.0		
Item First Ignited	1,206	545	661	0	0	100.0	45.2
Percent	100.0	45.2	54.8	0.0	0.0		
Cause of Ignition	1,206	1,047	159	0	0	100.0	86.8
Percent	100.0	86.8	13.2	0.0	0.0		
Factors Contributing to Ignition	1,206	662	544	0	0	100.0	54.9
Percent	100.0	54.9	45.1	0.0	0.0		
Equipment Involved in Ignition	1,206	474	32	0	700	42.0	39.3
Percent	100.0	39.3	2.7	0.0	58.0		
Fire Spread	1,206	1,183	0	0	23	98.1	98.1
Percent	100.0	98.1	0.0	0.0	1.9		
Presence of Detectors	1,206	705	481	0	20	98.4	58.5
Percent	100.0	58.5	39.9	0.0	1.7		
Detector Operation (when present)	423	274	149	0	0	100.0	64.8
Percent	100.0	64.8	35.2	0.0	0.0		

[24]Does not include confined building fires (small fires confined to the object of origin) or outside rubbish fires (fires with no value), as for these fires, only the most basic information about the incident is required.

Table 15. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Buildings and Mobile Property Structure Fatal Fires, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Detector Effectiveness (when present and operating)	274	116	54	0	104	62.0	42.3
Percent	100.0	42.3	19.7	0.0	38.0		
Presence of AES	1,206	1,078	103	0	25	97.9	89.4
Percent	100.0	89.4	8.5	0.0	2.1		
2010							
Property Use	1,316	1,313	3	0	0	100.0	99.8
Percent	100.0	99.8	0.2	0.0	0.0		
Area of Fire Origin	1,316	1,058	258	0	0	100.0	80.4
Percent	100.0	80.4	19.6	0.0	0.0		
Heat Source	1,316	567	749	0	0	100.0	43.1
Percent	100.0	43.1	56.9	0.0	0.0		
Item First Ignited	1,316	557	759	0	0	100.0	42.3
Percent	100.0	42.3	57.7	0.0	0.0		
Cause of Ignition	1,316	1,133	183	0	0	100.0	86.1
Percent	100.0	86.1	13.9	0.0	0.0		
Factors Contributing to Ignition	1,316	677	639	0	0	100.0	51.4
Percent	100.0	51.4	48.6	0.0	0.0		
Equipment Involved in Ignition	1,316	473	38	0	805	38.8	35.9
Percent	100.0	35.9	2.9	0.0	61.2		
Fire Spread	1,316	1,289	0	0	27	97.9	97.9
Percent	100.0	97.9	0.0	0.0	2.1		
Presence of Detectors	1,316	791	501	0	24	98.2	60.1
Percent	100.0	60.1	38.1	0.0	1.8		

Table 15. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Buildings and Mobile Property Structure Fatal Fires, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Detector Operation (when present)	479	294	185	0	0	100.0	61.4
Percent	100.0	61.4	38.6	0.0	0.0		
Detector Effectiveness (when present and operating)	294	132	61	0	101	65.6	44.9
Percent	100.0	44.9	20.7	0.0	34.4		
Presence of AES	1,316	1,177	110	0	29	97.8	89.4
Percent	100.0	89.4	8.4	0.0	2.2		
2011							
Property Use	1,338	1,335	3	0	0	100.0	99.8
Percent	100.0	99.8	0.2	0.0	0.0		
Area of Fire Origin	1,338	1,069	269	0	0	100.0	79.9
Percent	100.0	79.9	20.1	0.0	0.0		
Heat Source	1,338	574	764	0	0	100.0	42.9
Percent	100.0	42.9	57.1	0.0	0.0		
Item First Ignited	1,338	587	751	0	0	100.0	43.9
Percent	100.0	43.9	56.1	0.0	0.0		
Cause of Ignition	1,338	1,157	181	0	0	100.0	86.5
Percent	100.0	86.5	13.5	0.0	0.0		
Factors Contributing to Ignition	1,338	700	638	0	0	100.0	52.3
Percent	100.0	52.3	47.7	0.0	0.0		
Equipment Involved in Ignition	1,338	493	35	0	810	39.4	36.8
Percent	100.0	36.8	2.6	0.0	60.5		
Fire Spread	1,338	1,314	0	0	24	98.2	98.2
Percent	100.0	98.2	0	0.0	1.8		

Table 15. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Buildings and Mobile Property Structure Fatal Fires, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Presence of Detectors	1,338	780	536	0	22	98.4	58.3
Percent	100.0	58.3	40.1	0.0	1.6		
Detector Operation (when present)	476	312	164	0	0	100.0	65.5
Percent	100.0	65.5	34.5	0.0	0.0		
Detector Effectiveness (when present and operating)	312	146	76	0	90	71.2	46.8
Percent	100.0	46.8	24.4	0.0	28.8		
Presence of AES	1,338	1,205	110	0	23	98.3	90.1
Percent	100.0	90.1	8.2	0.0	1.7		

Source: NFIRS.

Note: a. Valid unknown entries are coded as "U," "UU" or "UUU" (depending on the field length). These coded values are distinctly different from blanks and no entries as the lack of information only implies that the information was not given and does not imply that the element is truly "unknown."

Table 16. Data Quality for Common NFIRS Data Elements Used in USFA Analyses Distribution of Buildings[25] and Mobile Property Structure Fatal Fires by Reported Deaths, 2009 to 2011

Deaths per Incident	2009		2010		2011	
	Fires	Percent	Fires	Percent	Fires	Percent
1	1,015	84.2	1,127	85.6	1,168	87.3
2	141	11.7	134	10.2	120	9.0
3	33	2.7	31	2.4	30	2.2
4	10	0.8	11	0.8	10	0.7
5	5	0.4	8	0.6	5	0.4
More than 5	2	0.2	5	0.4	5	0.4
Total fires	1,206	100.0	1,316	100.0	1,338	100.0

Source: NFIRS.

Table 17. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fires With Injuries, 2009 to 2011

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2009							
Property Use	7,599	7,571	28	0	0	100.0	99.6
Percent	100.0	99.6	0.4	0.0	0.0		
Area of Fire Origin	7,599	6,526	356	0	717	90.6	85.9
Percent	100.0	85.9	4.7	0.0	9.4		
Heat Source	7,599	5,046	1,836	0	717	90.6	66.4
Percent	100.0	66.4	24.2	0.0	9.4		

[25]Does not include confined building fires (small fires confined to the object of origin) or outside rubbish fires (fires with no value), as for these fires, only the most basic information about the incident is required.

Table 17. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fires With Injuries, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Item First Ignited	7,599	5,014	1,868	0	717	90.6	66.0
Percent	100.0	66.0	24.6	0.0	9.4		
Cause of Ignition	7,599	6,322	560	0	717	90.6	83.2
Percent	100.0	83.2	7.4	0.0	9.4		
Factors Contributing to Ignition	7,599	5,419	1,463	0	717	90.6	71.3
Percent	100.0	71.3	19.3	0.0	9.4		
Equipment Involved in Ignition	7,599	3,228	99	0	4,272	43.8	42.5
Percent	100.0	42.5	1.3	0.0	56.2		
Fire Spread	7,599	5,393	0	0	2,206	71.0	71.0
Percent	100.0	71.0	0.0	0.0	29.0		
Presence of Detectors	7,599	4,139	1,279	0	2,181	71.3	54.5
Percent	100.0	54.5	16.8	0.0	28.7		
Detector Operation (when present)	2,722	2,187	535	0	0	100.0	80.3
Percent	100.0	80.3	19.7	0.0	0.0		
Detector Effectiveness (when present and operating)	1,631	1,424	207	0	0	100.0	87.3
Percent	100.0	87.3	12.7	0.0	0.0		
Presence of AES	7,599	5,219	174	0	2,206	71.0	68.7
Percent	100.0	68.7	2.3	0.0	29.0		
2010							
Property Use	8,164	8,126	38	0	0	100.0	99.5
Percent	100.0	99.5	0.5	0.0	0.0		
Area of Fire Origin	8,164	7,012	426	0	726	91.1	85.9
Percent	100.0	85.9	5.2	0.0	8.9		

Table 17. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fires With Injuries, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Heat Source	8,164	5,407	2,031	0	726	91.1	66.2
Percent	100.0	66.2	24.9	0.0	8.9		
Item First Ignited	8,164	5,336	2,100	0	728	91.1	65.4
Percent	100.0	65.4	25.7	0.0	8.9		
Cause of Ignition	8,164	6,843	593	0	728	91.1	83.8
Percent	100.0	83.8	7.3	0.0	8.9		
Factors Contributing to Ignition	8,164	5,733	1,705	0	726	91.1	70.2
Percent	100.0	70.2	20.9	0.0	8.9		
Equipment Involved in Ignition	8,164	3,436	99	0	4,629	43.3	42.1
Percent	100.0	42.1	1.2	0.0	56.7		
Fire Spread	8,164	5,959	0	0	2,205	73.0	73.0
Percent	100.0	73.0	0.0	0.0	27.0		
Presence of Detectors	8,164	4,688	1,284	0	2,192	73.1	57.4
Percent	100.0	57.4	15.7	0.0	26.8		
Detector Operation (when present)	3,321	2,841	480	0	0	100.0	85.5
Percent	100.0	85.5	14.5	0.0	0.0		
Detector Effectiveness (when present and operating)	2,091	1,859	232	0	0	100.0	88.9
Percent	100.0	88.9	11.1	0.0	0.0		
Presence of AES	8,164	5,701	225	0	2,238	72.6	69.8
Percent	100.0	69.8	2.8	0.0	27.4		
2011							
Property Use	8,121	8,083	38	0	0	100.0	99.5
Percent	100.0	99.5	0.5	0.0	0.0		

Table 17. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fires With Injuries, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Area of Fire Origin	8,121	7,052	412	0	657	91.9	86.8
Percent	100.0	86.8	5.1	0.0	8.1		
Heat Source	8,121	5,498	1,966	0	657	91.9	67.7
Percent	100.0	67.7	24.2	0.0	8.1		
Item First Ignited	8,121	5,371	2,093	0	657	91.9	66.1
Percent	100.0	66.1	25.8	0.0	8.1		
Cause of Ignition	8,121	6,883	581	0	657	92.0	84.8
Percent	100.0	84.8	7.2	0.0	8.1		
Factors Contributing to Ignition	8,121	5,802	1,662	0	657	91.9	71.4
Percent	100.0	71.4	20.5	0.0	8.1		
Equipment Involved in Ignition	8,121	3,540	72	0	4,509	44.5	43.6
Percent	100.0	43.6	0.9	0.0	55.5		
Fire Spread	8,121	6,056	0	0	2,065	74.6	74.6
Percent	100.0	74.6	0.0	0.0	25.4		
Presence of Detectors	8,121	4,724	1,342	0	2,055	74.7	58.2
Percent	100.0	58.2	16.5	0.0	25.3		
Detector Operation (when present)	3,347	2,853	494	0	0	100.0	85.2
Percent	100.0	85.2	14.8	0.0	0.0		
Detector Effectiveness (when present and operating)	2,105	1,871	234	0	0	100.0	88.9
Percent	100.0	88.9	11.1	0.0	0.0		
Presence of AES	8,121	5,802	236	0	2,083	74.3	71.4
Percent	100.0	71.4	2.9	0.0	25.6		

Source: NFIRS.

Note: a. Valid unknown are entries coded as "U," "UU" or "UUU" (depending on the field length). These coded values are distinctly different from blanks and no entries as the lack of information only implies that the information was not given and does not imply that the element is truly "unknown."

Table 18. Data Quality for Common NFIRS Data Elements Used in USFA Analyses Distribution of Reported Fires With Injuries by Reported Injuries, 2009 to 2011

Injuries per Incident	2009		2010		2011	
	Fires	Percent	Fires	Percent	Fires	Percent
1	6,378	83.9	6,763	82.8	6,738	83.0
2	832	10.9	973	11.9	942	11.6
3	212	2.8	263	3.2	254	3.1
4	84	1.1	76	0.9	97	1.2
5	50	0.7	37	0.5	26	0.3
More than 5	43	0.6	52	0.6	64	0.8
Total fires	7,599	100.0	8,164	100.0	8,121	100.0

Source: NFIRS.
Note: Total for 2010 does not add up to 100 percent due to rounding.

Table 19. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Buildings[26] and Mobile Property Structures Fires With Injuries, 2009 to 2011

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2009							
Property Use	5,287	5,268	19	0	0	100.0	99.6
Percent	100.0	99.6	0.4	0.0	0.0		
Area of Fire Origin	5,287	4,992	295	0	0	100.0	94.4
Percent	100.0	94.4	5.6	0.0	0.0		
Heat Source	5,287	3,795	1,492	0	0	100.0	71.8
Percent	100.0	71.8	28.2	0.0	0.0		

[26]Does not include confined building fires (small fires confined to the object of origin) or outside rubbish fires (fires with no value), as for these fires, only the most basic information about the incident is required.

Table 19. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Buildings and Mobile Property Structures Fires With Injuries, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Item First Ignited	5,287	3,787	1,500	0	0	100.0	71.6
Percent	100.0	71.6	28.4	0.0	0.0		
Cause of Ignition	5,287	4,860	427	0	0	100.0	91.9
Percent	100.0	91.9	8.1	0.0	0.0		
Factors Contributing to Ignition	5,287	4,076	1,211	0	0	100.0	77.1
Percent	100.0	77.1	22.9	0.0	0.0		
Equipment Involved in Ignition	5,287	2,528	87	0	2,672	49.4	47.8
Percent	100.0	47.8	1.6	0.0	50.5		
Fire Spread	5,287	5,215	0	0	72	98.6	98.6
Percent	100.0	98.6	0.0	0.0	1.4		
Presence of Detectors	5,287	3,983	1,242	0	62	98.8	75.3
Percent	100.0	75.3	23.5	0.0	1.2		
Detector Operation (when present)	2,722	2,187	535	0	0	100.0	80.3
Percent	100.0	80.3	19.7	0.0	0.0		
Detector Effectiveness (when present and operating)	1,631	1,424	207	0	0	100.0	87.3
Percent	100.0	87.3	12.7	0.0	0.0		
Presence of AES	5,287	5,047	161	0	79	98.5	95.5
Percent	100.0	95.5	3.0	0.0	1.5		
2010							
Property Use	5,759	5,729	30	0	0	100.0	99.5
Percent	100.0	99.5	0.5	0.0	0.0		
Area of Fire Origin	5,759	5,412	347	0	0	100.0	94.0
Percent	100.0	94.0	6.0	0.0	0.0		

Table 19. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Buildings and Mobile Property Structures Fires With Injuries, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Heat Source	5,759	4,112	1,647	0	0	100.0	71.4
Percent	100.0	71.4	28.6	0.0	0.0		
Item First Ignited	5,759	4,068	1,690	0	1	99.9	70.6
Percent	100.0	70.6	29.3	0.0	0.0		
Cause of Ignition	5,759	5,297	461	0	1	100.0	92.0
Percent	100.0	92.0	8.0	0.0	0.0		
Factors Contributing to Ignition	5,759	4,342	1,417	0	0	100.0	75.4
Percent	100.0	75.4	24.6	0.0	0.0		
Equipment Involved in Ignition	5,759	2,696	89	0	2,974	48.3	46.8
Percent	100.0	46.8	1.5	0.0	51.6		
Fire Spread	5,759	5,680	0	0	79	98.6	98.6
Percent	100.0	98.6	0.0	0.0	1.4		
Presence of Detectors	5,759	4,443	1,246	0	70	98.7	77.1
Percent	100.0	77.1	21.6	0.0	1.2		
Detector Operation (when present)	3,123	2,656	467	0	0	100.0	85.0
Percent	100.0	85.0	15.0	0.0	0.0		
Detector Effectiveness (when present and operating)	1,946	1,718	228	0	0	100.0	88.3
Percent	100.0	88.3	11.7	0.0	0.0		
Presence of AES	5,759	5,439	213	0	107	98.1	94.4
Percent	100.0	94.4	3.7	0.0	1.9		
2011							
Property Use	5,852	5,818	34	0	0	100.0	99.4
Percent	100.0	99.4	0.6	0.0	0.0		

Table 19. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Buildings and Mobile Property Structures Fires With Injuries, 2009 to 2011 — continued

Data Element	Number of Reported Fires	Number and Percent of Reported Fires				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
Area of Fire Origin	5,852	5,518	334	0	0	100.0	94.3
Percent	100.0	94.3	5.7	0.0	0.0		
Heat Source	5,852	4,237	1,615	0	0	100.0	72.4
Percent	100.0	72.4	27.6	0.0	0.0		
Item First Ignited	5,852	4,164	1,688	0	0	100.0	71.2
Percent	100.0	71.2	28.8	0.0	0.0		
Cause of Ignition	5,852	5,382	470	0	0	100.0	92.0
Percent	100.0	92.0	8.0	0.0	0.0		
Factors Contributing to Ignition	5,852	4,448	1,404	0	0	100.0	76.0
Percent	100.0	76.0	24.0	0.0	0.0		
Equipment Involved in Ignition	5,852	2,808	69	0	2,975	49.2	48.0
Percent	100.0	48.0	1.2	0.0	50.8		
Fire Spread	5,852	5,778	0	0	74	98.7	98.7
Percent	100.0	98.7	0.0	0.0	1.3		
Presence of Detectors	5,852	4,492	1,285	0	75	98.8	76.8
Percent	100.0	76.8	22.0	0.0	1.3		
Detector Operation (when present)	3,154	2,672	482	0	0	100.0	84.7
Percent	100.0	84.7	15.3	0.0	0.0		
Detector Effectiveness (when present and operating)	1,977	1,750	227	0	0	100.0	88.5
Percent	100.0	88.5	11.5	0.0	0.0		
Presence of AES	5,852	5,539	216	0	97	98.4	94.7
Percent	100.0	94.7	3.7	0.0	1.7		

Source: NFIRS.

Note: a. Valid unknown entries are coded as "U," "UU" or "UUU" (depending on the field length). These coded values are distinctly different from blanks and no entries as the lack of information only implies that the information was not given and does not imply that the element is truly "unknown."

Table 20. Data Quality for Common NFIRS Data Elements Used in USFA Analyses Distribution of Buildings[27] and Mobile Property Structure Fires With Injuries by Reported Injuries, 2009 to 2011

Injuries per Incident	2009		2010		2011	
	Injuries	Percent	Injuries	Percent	Injuries	Percent
1	4,272	80.8	4,599	79.9	4,690	80.1
2	672	12.7	785	13.6	764	13.1
3	184	3.5	224	3.9	227	3.9
4	76	1.4	71	1.2	90	1.5
5	42	0.8	34	0.6	24	0.4
More than 5	41	0.8	46	0.8	57	1
Total injuries	5,287	100.0	5,759	100.0	5,852	100.0

Source: NFIRS.

[27]Does not include confined building fires (small fires confined to the object of origin) or outside rubbish fires (fires with no value), as for these fires, only the most basic information about the incident is required.

Table 21. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Distribution of Fires With Reported Property Dollar Loss[28], 2009 to 2011

Reported Property Dollar Loss	All Fires		Nonbuilding Structure		Buildings and Mobile Property Structure		Vehicle		Outside	
	Fires	Percent	Fires	Percent	Fires	Percent	Fires	Percent	Fires	Percent
2009										
No Loss Reported	150,222	26.9	2,720	33.0	30,209	18.1	77,822	33.2	28,475	20.6
$0	212,895	38.1	2,289	27.7	33,791	20.2	141,220	60.3	35,595	25.7
$100 and under	13,207	2.4	261	3.2	3,777	2.3	6,284	2.7	2,885	2.1
$101 - $500	22,530	4.0	627	7.6	9,374	5.6	3,474	1.5	9,055	6.5
$501 - $1,000	20,650	3.7	420	5.1	8,620	5.2	1,759	0.8	9,851	7.1
$1,001 - $5,000	58,063	10.4	734	8.9	23,317	13.9	2,341	1.0	31,671	22.9
$5,001 - $10,000	23,833	4.3	344	4.2	12,772	7.6	554	0.2	10,163	7.3
$10,001 - $50,000	39,070	7.0	555	6.7	28,659	17.1	567	0.2	9,289	6.7
$50,001 - $100,000	10,560	1.9	187	2.3	9,339	5.6	111	0.0	923	0.7
$100,001 - $500,000	7,451	1.3	109	1.3	6,726	4.0	93	0.0	523	0.4
$500,001 - $1,000,000	479	0.1	5	0.1	431	0.3	17	0.0	26	0.0
Over $1,000,000	272	0.0	3	0.0	234	0.1	16	0.0	19	0.0
Total	559,232	100.0	8,254	100.0	167,249	100.0	234,258	100.0	138,475	100.0
2010										
No Loss Reported	169,177	27.7	2,992	31.9	37,092	19.8	86,943	33.7	42,150	27.1
$0	233,837	38.3	2,728	29.1	37,750	20.1	156,731	60.8	36,628	23.6
$100 and under	12,776	2.1	315	3.4	4,352	2.3	5,408	2.1	2,701	1.7
$101 - $500	23,353	3.8	731	7.8	10,403	5.5	3,490	1.4	8,729	5.6
$501 - $1,000	21,971	3.6	508	5.4	9,906	5.3	1,665	0.6	9,892	6.4
$1,001 - $5,000	63,488	10.4	905	9.6	26,333	14.0	2,303	0.9	33,947	21.9
$5,001 - $10,000	25,562	4.2	330	3.5	13,973	7.4.0	607	0.2	10,652	6.9
$10,001 - $50,000	40,729	6.7	586	6.2	30,604	16.3	589	0.2	8,950	5.8

[28]Does not include confined building fires (small fires confined to the object of origin) or outside rubbish fires (fires with no value).

Table 21. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Distribution of Fires With Reported Property Dollar Loss, 2009 to 2011 - continued

Reported Property Dollar Loss	All Fires		Nonbuilding Structure		Buildings and Mobile Property Structure		Vehicle		Outside	
	Fires	Percent	Fires	Percent	Fires	Percent	Fires	Percent	Fires	Percent
$50,001 - $100,000	11,003	1.8	174	1.9	9,765	5.2	95	0.0	969	0.6
$100,001 - $500,000	7,688	1.3	103	1.1	6,895	3.7	95	0.0	595	0.4
$500,001 - $1,000,000	507	0.1	4	0.0	461	0.2	15	0.0	27	0.0
Over $1,000,000	219	0.0	5	0.1	177	0.1	10	0.0	27	0.0
Total	610,310	100.0	9,381	100.0	187,711	100.0	257,951	100.0	155,267	100.0
2011										
No Loss Reported	173,062	27.8	3,135	31.4	37,331	19.8	92,929	33.9	39,667	26.6
$0	244,170	39.2	2,910	29.1	38,763	20.5	166,270	60.6	36,227	24.3
$100 and under	12,635	2.0	359	3.6	4,324	2.3	5,497	2.0	2,455	1.6
$101 - $500	22,846	3.7	848	8.5	10,531	5.6	3,568	1.3	7,899	5.3
$501 - $1,000	21,427	3.4	534	5.3	9,876	5.2	1,909	0.7	9,108	6.1
$1,001 - $5,000	63,062	10.1	931	9.3	26,463	14.0	2,575	0.9	33,093	22.2
$5,001 - $10,000	25,573	4.1	362	3.6	14,087	7.5	693	0.3	10,431	7.0
$10,001 - $50,000	41,009	6.6	594	5.9	30,863	16.3	642	0.2	8,910	6.0
$50,001 - $100,000	10,744	1.7	209	2.1	9,486	5.0	140	0.1	909	0.6
$100,001 - $500,000	7,344	1.2	104	1.0	6,546	3.5	120	0.0	574	0.4
$500,001 - $1,000,000	563	0.1	7	0.1	498	0.3	17	0.0	41	0.0
Over $1,000,000	249	0.0	3	0.0	208	0.1	19	0.0	19	0.0
Total	622,684	100.0	9,996	100.0	188,976	100.0	274,379	100.0	149,333	100.0

Source: NFIRS.
Note: Some totals do not add up to 100 percent due to rounding.

Table 22. Data Quality for Common NFIRS Data Elements Used in USFA Analyses Distribution of Fires With Reported Contents Dollar Loss in Buildings and Mobile Property Structure Fires, 2009 to 2011

Reported Contents Dollar Loss	2009		2010		2011	
	Fires	Percent	Fires	Percent	Fires	Percent
No Loss Reported	30,209	21.2	43,804	23.3	43,576	23.1
$0	33,791	30.8	56,606	30.2	58,251	30.8
$100 and under	3,777	4.1	7,422	4.0	7,348	3.9
$101 - $500	9,374	6.5	12,076	6.4	12,300	6.5
$501 - $1,000	8,620	5.7	10,771	5.7	10,952	5.8
$1,001 - $5,000	23,317	12.6	23,262	12.4	23,496	12.4
$5,001 - $10,000	12,772	6.2	11,151	5.9	10,972	5.8
$10,001 - $50,000	28,659	9.9	17,365	9.3	16,918	9.0
$50,001 - $100,000	9,339	1.9	3,295	1.8	3,174	1.7
$100,001 - $500,000	6,726	1.0	1,703	0.9	1,737	0.9
$500,001 - $1,000,000	431	0.1	178	0.1	159	0.1
Over $1,000,000	234	0.0	78	0.0	93	0.0
Total	167,249	100.0	187,711	100.0	188,976	100.0

Source: NFIRS.

Table 23. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fire Deaths, 2009 to 2011

Data Element	Number of Reported Deaths	Number and Percent of Reported Deaths				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2009							
Gender	1,831	1,831	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Age or Date of Birth[b]	1,831	1,788	0	42	1	97.7	97.7
Percent	100.0	97.7	0.0	2.3	0.1		
Race	1,831	1,110	73	0	648	64.6	60.6
Percent	100.0	60.6	4.0	0.0	35.4		
Ethnicity	1,831	786	0	0	1,045	42.9	42.9
Percent	100.0	42.9	0.0	0.0	57.1		
Severity	1,831	1,831	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Cause of Injury	1,831	1,090	234	0	507	72.3	59.5
Percent	100.0	59.5	12.8	0.0	27.7		
Human Factors Contributing to Injury	1,831	994	0	0	837	54.3	54.3
Percent	100.0	54.3	0.0	0.0	45.7		
Factors Contributing to Injury	1,831	849	2	0	980	46.5	46.4
Percent	100.0	46.4	0.1	0.0	53.5		
Activity When Injured	1,831	601	395	0	835	54.4	32.8
Percent	100.0	32.8	21.6	0.0	45.6		
Primary Apparent Symptom	1,831	837	169	0	825	54.9	45.7
Percent	100.0	45.7	9.2	0.0	45.1		
Primary Area of Body Injured	1,831	918	0	0	913	50.1	50.1
Percent	100.0	50.1	0.0	0.0	49.9		

Table 23. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fire Deaths, 2009 to 2011 — continued

Data Element	Number of Reported Deaths	Number and Percent of Reported Deaths				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2010							
Gender	1,978	1,978	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Age or Date of Birth[b]	1,978	1,949	0	29	0	98.5	98.5
Percent	100.0	98.5	0.0	1.5	0.0		
Race	1,978	1,156	77	1	744	62.3	58.4
Percent	100.0	58.4	3.9	0.1	37.6		
Ethnicity	1,978	779	0	0	1,199	39.4	39.4
Percent	100.0	39.4	0.0	0.0	60.6		
Severity	1,978	1,978	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Cause of Injury	1,978	1,133	253	0	592	70.1	57.3
Percent	100.0	57.3	12.8	0.0	29.9		
Human Factors Contributing to Injury	1,978	1,096	0	0	882	55.4	55.4
Percent	100.0	55.4	0.0	0.0	44.6		
Factors Contributing to Injury	1,978	949	0	0	1,029	48.0	48.0
Percent	100.0	48.0	0.0	0.0	52.0		
Activity When Injured	1,978	616	453	0	909	54.0	31.1
Percent	100.0	31.1	22.9	0.0	46.0		
Primary Apparent Symptom	1,978	904	162	0	912	53.9	45.7
Percent	100.0	45.7	8.2	0.0	46.1		
Primary Area of Body Injured	1,978	975	0	0	1,003	49.3	49.3
Percent	100.0	49.3	0.0	0.0	50.7		

Table 23. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fire Deaths, 2009 to 2011 — continued

Data Element	Number of Reported Deaths	Number and Percent of Reported Deaths				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2011							
Gender	2,007	2,007	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Age or Date of Birth[b]	2,007	1,966	0	41	0	98.0	98.0
Percent	100.0	98.0	0.0	2.0	0.0		
Race	2,007	1,182	83	1	741	63.0	58.9
Percent	100.0	58.9	4.1	0.0	36.9		
Ethnicity	2,007	830	0	0	1,177	41.4	41.4
Percent	100.0	41.4	0.0	0.0	58.6		
Severity	2,007	2,007	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Cause of Injury	2,007	1,209	232	0	566	71.8	60.2
Percent	100.0	60.2	11.6	0.0	28.2		
Human Factors Contributing to Injury	2,007	1,072	0	0	935	53.4	53.4
Percent	100.0	53.4	0.0	0.0	46.6		
Factors Contributing to Injury	2,007	865	0	0	1,142	43.1	43.1
Percent	100.0	43.1	0.0	0.0	56.9		
Activity When Injured	2,007	658	420	0	929	53.7	32.8
Percent	100.0	32.8	20.9	0.0	46.3		
Primary Apparent Symptom	2,007	903	166	0	938	53.3	45.0
Percent	100.0	45.0	8.3	0.0	46.7		
Primary Area of Body Injured	2,007	959	0	0	1,048	47.8	47.8
Percent	100.0	47.8	0.0	0.0	52.2		

Source: NFIRS.

Notes: a. Valid unknown entries are coded as "U," "UU" or "UUU" (depending on the field length). These coded values are distinctly different from blanks and no entries as the lack of information only implies that the information was not given and does not imply that the element is truly "unknown."

b. In the NFIRS paper forms and the NFIRS CRG, the full data element name is Age or Date of Birth; in the civilian fire casualty file in the PDR, the data element is Age.

Table 24. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fire Deaths in Buildings[29] and Mobile Property Structures, 2009 to 2011

Data Element	Number of Reported Deaths	Number and Percent of Reported Deaths				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2009							
Gender	1,476	1,476	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Age or Date of Birth[b]	1,476	1,452	0	23	1	98.4	98.4
Percent	100.0	98.4	0.0	1.6	0.1		
Race	1,476	936	46	0	494	66.5	63.4
Percent	100.0	63.4	3.1	0.0	33.5		
Ethnicity	1,476	657	0	0	819	44.5	44.5
Percent	100.0	44.5	0.0	0.0	55.5		
Severity	1,476	1,476	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Cause of Injury	1,476	896	183	0	397	73.1	60.7
Percent	100.0	60.7	12.4	0.0	26.9		
Human Factors Contributing to Injury	1,476	822	0	0	654	55.7	55.7
Percent	100.0	55.7	0.0	0.0	44.3		
Factors Contributing to Injury	1,476	682	2	0	792	46.3	46.2
Percent	100.0	46.2	0.1	0.0	53.7		
Activity When Injured	1,476	508	322	0	646	56.2	34.4
Percent	100.0	34.4	21.8	0.0	43.8		
Primary Apparent Symptom	1,476	710	135	0	631	57.2	48.1
Percent	100.0	48.1	9.1	0.0	42.8		
Primary Area of Body Injured	1,476	763	0	0	713	51.7	51.7
Percent	100.0	51.7	0.0	0.0	48.3		

[29]Does not include confined building fires (small fires confined to the object of origin) or outside rubbish fires (fires with no value), as for these fires, only the most basic information about the incident is required.

Table 24. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fire Deaths in Buildings and Mobile Property Structures, 2009 to 2011 — continued

Data Element	Number of Reported Deaths	Number and Percent of Reported Deaths				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2010							
Gender	1,605	1,605	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Age or Date of Birth[b]	1,605	1,586	0	19	0	98.8	98.8
Percent	100.0	98.8	0.0	1.2	0.0		
Race	1,605	992	48	1	564	64.8	61.8
Percent	100.0	61.8	3.0	0.1	35.1		
Ethnicity	1,605	658	0	0	947	41.0	41.0
Percent	100.0	41.0	0.0	0.0	59.0		
Severity	1,605	1,605	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Cause of Injury	1,605	929	200	0	476	70.4	57.9
Percent	100.0	57.9	12.5	0.0	29.7		
Human Factors Contributing to Injury	1,605	924	0	0	681	57.6	57.6
Percent	100.0	57.6	0.0	0.0	42.4		
Factors Contributing to Injury	1,605	765	0	0	840	47.7	47.7
Percent	100.0	47.7	0.0	0.0	52.3		
Activity When Injured	1,605	508	374	0	723	55.0	31.7
Percent	100.0	31.7	23.3	0.0	45.0		
Primary Apparent Symptom	1,605	753	132	0	720	55.1	46.9
Percent	100.0	46.9	8.2	0.0	44.9		
Primary Area of Body Injured	1,605	789	0	0	816	49.2	49.2
Percent	100.0	49.2	0.0	0.0	50.8		

Table 24. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fire Deaths in Buildings and Mobile Property Structures, 2009 to 2011 — continued

Data Element	Number of Reported Deaths	Number and Percent of Reported Deaths				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2011							
Gender	1,593	1,593	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Age or Date of Birth[b]	1,593	1,569	0	24	0	98.5	98.5
Percent	100.0	98.5	0.0	1.5	0.0		
Race	1,593	994	47	1	551	65.4	62.4
Percent	100.0	62.4	3.0	0.1	34.6		
Ethnicity	1,593	673	0	0	920	42.2	42.2
Percent	100.0	42.2	0.0	0.0	57.8		
Severity	1,593	1,593	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Cause of Injury	1,593	970	189	0	434	72.8	60.9
Percent	100.0	60.9	11.9	0.0	27.2		
Human Factors Contributing to Injury	1,593	850	0	0	743	53.4	53.4
Percent	100.0	53.4	0.0	0.0	46.6		
Factors Contributing to Injury	1,593	656	0	0	937	41.2	41.2
Percent	100.0	41.2	0.0	0.0	58.8		
Activity When Injured	1,593	548	330	0	715	55.1	34.4
Percent	100.0	34.4	20.7	0.0	44.9		
Primary Apparent Symptom	1,593	738	125	0	730	54.1	46.3
Percent	100.0	46.3	7.8	0.0	45.8		
Primary Area of Body Injured	1,593	754	0	0	839	47.3	47.3
Percent	100.0	47.3	0.0	0.0	52.7		

Source: NFIRS.

Notes: a. Valid unknown entries are coded as "U," "UU" or "UUU" (depending on the field length). These coded values are distinctly different from blanks and no entries as the lack of information only implies that the information was not given and does not imply that the element is truly "unknown."

b. In the NFIRS paper forms and the NFIRS CRG, the full data element name is Age or Date of Birth; in the civilian fire casualty file in the PDR, the data element is Age.

Table 25. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fire Injuries, 2009 to 2011

Data Element	Number of Reported Injuries	Number and Percent of Reported Injuries				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2009							
Gender	9,582	9,582	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Age or Date of Birth[b]	9,582	9,357	0	215	10	97.7	97.7
Percent	100.0	97.7	0.0	2.2	0.1		
Race	9,582	5,241	329	13	3,999	58.1	54.7
Percent	100.0	54.7	3.4	0.1	41.7		
Ethnicity	9,582	3,792	0	0	5,790	39.6	39.6
Percent	100.0	39.6	0.0	0.0	60.4		
Severity	9,582	9,204	378	0	0	100.0	96.1
Percent	100.0	96.1	3.9	0.0	00		
Cause of Injury	9,582	6,955	224	0	2,403	74.9	72.6
Percent	100.0	72.6	2.3	0.0	25.1		
Human Factors Contributing to Injury	9,582	5,824	0	0	3,758	60.8	60.8
Percent	100.0	60.8	0.0	0.0	39.2		
Factors Contributing to Injury	9,582	5,003	5	0	4,574	52.3	52.2
Percent	100.0	52.2	0.1	0.0	47.7		
Activity When Injured	9,582	5,696	679	0	3,207	66.5	59.4
Percent	100.0	59.4	7.1	0.0	33.5		
Primary Apparent Symptom	9,582	6,101	104	0	3,377	64.8	63.7
Percent	100.0	63.7	1.1	0.0	35.2		
Primary Area of Body Injured	9,582	5,568	2	0	4,012	58.1	58.1
Percent	100.0	58.1	0.0	0.0	41.9		

Table 25. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fire Injuries, 2009 to 2011 — continued

Data Element	Number of Reported Injuries	Number and Percent of Reported Injuries				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2010							
Gender	10,376	10,376	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Age or Date of Birth[b]	10,376	10,193	0	183	0	98.2	98.2
Percent	100.0	98.2	0.0	1.8	0.0		
Race	10,376	5,852	373	7	4,144	60.0	56.4
Percent	100.0	56.4	3.6	0.1	39.9		
Ethnicity	10,376	4,355	0	0	6,021	42.0	42.0
Percent	100.0	42.0	0.0	0.0	58.0		
Severity	10,376	9,992	384	0	0	100.0	96.3
Percent	100.0	96.3	3.7	0.0	0.0		
Cause of Injury	10,376	7,624	227	0	2,525	75.7	73.5
Percent	100.0	73.5	2.2	0.0	24.3		
Human Factors Contributing to Injury	10,376	6,220	0	0	4,156	59.9	59.9
Percent	100.0	59.9	0.0	0.0	40.1		
Factors Contributing to Injury	10,376	5,204	2	1	5,169	50.2	50.2
Percent	100.0	50.2	0.0	0.0	49.8		
Activity When Injured	10,376	6,219	783	0	3,374	67.4	59.9
Percent	100.0	59.9	7.5	0.0	32.5		
Primary Apparent Symptom	10,376	7,018	124	0	3,234	68.8	67.6
Percent	100.0	67.6	1.2	0.0	31.2		
Primary Area of Body Injured	10,376	6,289	5	0	4,082	60.6	60.6
Percent	100.0	60.6	0.0	0.0	39.3		

Table 25. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fire Injuries, 2009 to 2011 — continued

Data Element	Number of Reported Injuries	Number and Percent of Reported Injuries				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2011							
Gender	10,428	10,428	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Age or Date of Birth[b]	10,428	10,203	0	224	1	97.8	97.8
Percent	100.0	97.8	0.0	2.1	0.0		
Race	10,428	5,602	369	6	4,451	57.2	53.7
Percent	100.0	53.7	3.5	0.1	42.7		
Ethnicity	10,428	4,189	0	0	6,239	40.2	40.2
Percent	100.0	40.2	0.0	0.0	59.8		
Severity	10,428	10,004	424	0	0	100.0	95.9
Percent	100.0	95.9	4.1	0.0	0.0		
Cause of Injury	10,428	7,478	285	0	2,665	74.4	71.7
Percent	100.0	71.7	2.7	0.0	25.6		
Human Factors Contributing to Injury	10,428	6,206	0	0	4,222	59.5	59.5
Percent	100.0	59.5	0.0	0.0	40.5		
Factors Contributing to Injury	10,428	5,154	1	0	5,273	49.4	49.4
Percent	100.0	49.4	0.0	0.0	50.6		
Activity When Injured	10,428	6,059	804	0	3,565	65.8	58.1
Percent	100.0	58.1	7.7	0.0	34.2		
Primary Apparent Symptom	10,428	6,811	153	0	3,464	66.8	65.3
Percent	100.0	65.3	1.5	0.0	33.2		
Primary Area of Body Injured	10,428	6,195	5	0	4,228	59.4	59.4
Percent	100.0	59.4	0.0	0.0	40.5		

Source: NFIRS.

Notes: a. Valid unknown entries are coded as "U," "UU" or "UUU" (depending on the field length). These coded values are distinctly different from blanks and no entries as the lack of information only implies that the information was not given and does not imply that the element is truly "unknown."

b. In the NFIRS paper forms and the NFIRS CRG, the full data element name is Age or Date of Birth; in the civilian fire casualty file in the PDR, the data element is Age.

Table 26. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fire Injuries in Buildings[30] and Mobile Property Structures, 2009 to 2011

Data Element	Number of Reported Injuries	Number and Percent of Reported Injuries				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2009							
Gender	6,988	6,988	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Age or Date of Birth[b]	6,988	6,818	0	165	5	97.6	97.6
Percent	100.0	97.6	0.0	2.4	0.1		
Race	6,988	3,779	257	12	2,940	57.8	54.1
Percent	100.0	54.1	3.7	0.2	42.1		
Ethnicity	6,988	2,760	0	0	4,228	39.5	39.5
Percent	100.0	39.5	0.0	0.0	60.5		
Severity	6,988	6,705	283	0	0	100.0	96.0
Percent	100.0	96.0	4.0	0.0	0.0		
Cause of Injury	6,988	5,027	189	0	1,772	74.6	71.9
Percent	100.0	71.9	2.7	0.0	25.4		
Human Factors Contributing to Injury	6,988	4,205	0	0	2,783	60.2	60.2
Percent	100.0	60.2	0.0	0.0	39.8		
Factors Contributing to Injury	6,988	3,591	5	0	3,392	51.5	51.4
Percent	100.0	51.4	0.1	0.0	48.5		
Activity When Injured	6,988	4,138	506	0	2,344	66.4	59.2
Percent	100.0	59.2	7.2	0.0	33.5		
Primary Apparent Symptom	6,988	4,451	84	0	2,453	64.9	63.7
Percent	100.0	63.7	1.2	0.0	35.1		
Primary Area of Body Injured	6,988	4,046	2	0	2,940	57.9	57.9
Percent	100.0	57.9	0.0	0.0	42.1		

[30]Does not include confined building fires (small fires confined to the object of origin) or outside rubbish fires (fires with no value), as for these fires, only the most basic information about the incident is required.

Table 26. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fire Injuries in Buildings and Mobile Property Structures, 2009 to 2011 — continued

Data Element	Number of Reported Injuries	Number and Percent of Reported Injuries				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2010							
Gender	7,639	7,639	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Age or Date of Birth[b]	7,639	7,488	0	151	0	98.0	98.0
Percent	100.0	98.0	0.0	2.0	0.0		
Race	7,639	4,311	274	4	3,050	60.0	56.4
Percent	100.0	56.4	3.6	0.1	39.9		
Ethnicity	7,639	3,216	0	0	4,423	42.1	42.1
Percent	100.0	42.1	0.0	0.0	57.9		
Severity	7,639	7,359	280	0	0	100.0	96.3
Percent	100.0	96.3	3.7	0.0	0.0		
Cause of Injury	7,639	5,605	181	0	1,853	75.8	73.4
Percent	100.0	73.4	2.4	0.0	24.3		
Human Factors Contributing to Injury	7,639	4,570	0	0	3,069	59.8	59.8
Percent	100.0	59.8	0.0	0.0	40.2		
Factors Contributing to Injury	7,639	3,834	2	0	3,803	50.2	50.2
Percent	100.0	50.2	0.0	0.0	49.8		
Activity When Injured	7,639	4,623	555	0	2,461	67.8	60.5
Percent	100.0	60.5	7.3	0.0	32.2		
Primary Apparent Symptom	7,639	5,206	104	0	2,329	69.6	68.2
Percent	100.0	68.2	1.4	0.0	30.5		
Primary Area of Body Injured	7,639	4,628	5	0	3,006	60.7	60.6
Percent	100.0	60.6	0.1	0.0	39.4		

Table 26. Data Element Quality and Usability for Common NFIRS Data Elements Used in USFA Analyses Reported Fire Injuries in Buildings and Mobile Property Structures, 2009 to 2011 — continued

Data Element	Number of Reported Injuries	Number and Percent of Reported Injuries				Quality Index	Usability Index
		Valid Known	Valid Unknown[a]	Invalid	Null or No Entry		
2011							
Gender	7,853	7,853	0	0	0	100.0	100.0
Percent	100.0	100.0	0.0	0.0	0.0		
Age or Date of Birth[b]	7,853	7,682	0	170	1	97.8	97.8
Percent	100.0	97.8	0.0	2.2	0.0		
Race	7,853	4,167	280	5	3,401	56.7	53.1
Percent	100.0	53.1	3.6	0.1	43.3		
Ethnicity	7,853	3,116	0	0	4,737	39.7	39.7
Percent	100.0	39.7	0.0	0.0	60.3		
Severity	7,853	7,514	339	0	0	100.0	95.7
Percent	100.0	95.7	4.3	0.0	0.0		
Cause of Injury	7,853	5,561	217	0	2,075	73.6	70.8
Percent	100.0	70.8	2.8	0.0	26.4		
Human Factors Contributing to Injury	7,853	4,597	0	0	3,256	58.5	58.5
Percent	100.0	58.5	0.0	0.0	41.5		
Factors Contributing to Injury	7,853	3,815	1	0	4,037	48.6	48.6
Percent	100.0	48.6	0.0	0.0	51.4		
Activity When Injured	7,853	4,524	582	0	2,747	65.0	57.6
Percent	100.0	57.6	7.4	0.0	35.0		
Primary Apparent Symptom	7,853	5,061	125	0	2,667	66.0	64.4
Percent	100.0	64.4	1.6	0.0	34.0		
Primary Area of Body Injured	7,853	4,571	5	0	3,277	58.3	58.2
Percent	100.0	58.2	0.1	0.0	41.7		

Source: NFIRS.

Notes: a. Valid unknown entries are coded as "U," "UU" or "UUU" (depending on the field length). These coded values are distinctly different from blanks and no entries as the lack of information only implies that the information was not given and does not imply that the element is truly "unknown."

b. In the NFIRS paper forms and the NFIRS CRG, the full data element name is Age or Date of Birth; in the civilian fire casualty file in the PDR, the data element is Age.

National Fire Protection Association Survey

The NFPA is a nongovernmental organization whose mission is "to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating consensus codes and standards, research, training and education." In support of their mission, the NFPA administers the annual National Fire Experience Survey, from which they calculate high-level national estimates of total fires, civilian deaths and injuries, and dollar loss. As described earlier in this report, estimates from the NFPA survey and percentages from the USFA's NFIRS are combined to portray a richer, more detailed picture of the fire situation in the U.S. This section documents the survey methodology and quality control measures taken by the NFPA to ensure these estimates are as accurate as practicable.

The remainder of this section is drawn from the NFPA's "Fire Loss in the United States During 2012," published in September 2013.

Each year, based on a sample survey of fire departments across the country, the NFPA estimates the national fire problem as measured by the number of fires that public fire departments attend and the resulting deaths, injuries and property losses that occur. This section explains the major steps in conducting the 2012 survey.

Sample Selection

The NFPA currently has 30,145 public fire departments listed in the U.S. in its Fire Service Inventory (FSI) file. Based on desired levels of statistical precision for the survey results and the staff available to process, edit, and follow up on the individual questionnaires, the NFPA determined that 3,000 fire departments was a reasonable number for the 2011 sample. Because of the variation in fire loss results by community size, fire departments were placed in one of the following 10 strata by size of community protected:

1,000,000 and up
500,000 to 999,999
250,0000 to 499,999
100,000 to 249,999
50,000 to 99,999
25,000 to 49,999
10,000 to 24,999
5,000 to 9,999
2,500 to 4,999
Under 2,500

Sample sizes for the individual strata were chosen to ensure the best estimate of civilian deaths in one- and two-family dwellings, the statistic that most aptly reflects the overall severity of the fire problem. All departments that protect 50,000 people or more were included. These 831 departments in the five highest strata protect 153,760,000 people.

A total sample of 2,592 was indicated for the remaining five population strata, assuming response rates similar to the past two years for the five highest strata. Sample sizes for individual strata were calculated using a methodology that assured optimum sample

allocations.[31] Based on the average variation in civilian deaths in one- and two-family dwellings by stratum for the last two years and on the estimated number of fire departments, appropriate relative sample weights were determined. The corresponding sample sizes by stratum were then calculated. The sample size by stratum was then adjusted based on the response rates from the last two years' returns. A sample size of 20,385 was found to be necessary to obtain the desired total response of 3,000 fire departments. For all strata, where a sample was necessary, departments were randomly selected.

Data Collection

The fire departments selected for the survey were sent the 2012 NFPA Fire Experience Questionnaire during the second week of January 2013. A second mailing was sent in mid-March to fire departments that had not responded to the first mailing. A total of 2,795 departments responded to the questionnaire — 2,097 to the first mailing and 698 to the second. There were 676 departments (24 percent) that responded by using the online version of the survey form.

The overall response rate was 14 percent, although response rates were considerably higher for departments protecting larger communities than they were for departments protecting smaller communities. The response rate was 50 percent for departments protecting communities with a population of 50,000 or more, 23 percent for departments protecting communities of 10,000 to 24,999, and 10 percent for departments protecting communities with a population less than 10,000 (which are comprised of mostly volunteers). The 2,795 departments that did respond protect 120,282,500 people, or 39 percent of the total U.S. population.

After the NFPA received the surveys, technical staff members of the Fire Analysis and Research Division reviewed them for completeness and consistency. When appropriate, they followed up on questions with a telephone call. After the review procedures were completed, the survey data were keyed to a computer file, where additional checks were made. The file was then ready for data analysis and estimation procedures.

Estimation Methodology

The estimation method used for the survey was ratio estimation with stratification by community size.[32] For each fire statistic, a sample loss rate was computed for each stratum. This rate consisted of the total for that particular statistic from all fire departments reporting it, divided by the total population protected by the departments reporting the statistic. Note that this means that the departments used in calculating each statistic could be different, reflecting differences in unreported statistics. The sample fire loss rates by stratum were then multiplied by population weighting factors. The estimates were then combined to provide the overall national estimate.

If this method of estimation is to be effective, estimates of the total number of fire departments and the total population protected in each stratum must be accurate. The NFPA makes every effort to ensure that this is the case. The population weights used for the national estimates were developed using the NFPA FSI file and U.S. Census Bureau population estimates.

For each estimate, a corresponding standard error was also calculated. The standard error is a measure of the error caused by the fact that estimates are based on a sampling of fire losses rather than on a complete census of the fire problem. Due to the fact that

[31]Steve K. Thompson, "Sampling," John Wiley, New York, NY, 1992, pp. 107-111.
[32]William G. Cochran, "Sampling Techniques," John Wiley, New York, NY, 1977, pp. 150-161.

the survey is based on a random sample, we can be very confident that the actual value falls within the percentage noted in parentheses for the overall national fire loss statistics: number of fires (2 percent), number of civilian deaths (11.3 percent), number of civilian injuries (5.5 percent), and property loss (3 percent).

The standard error helps in determining whether year-to-year differences are statistically significant. Differences that were found to be statistically significant were so noted in the tables. Property loss estimates are particularly prone to large standard errors because they are sensitive to unusually high losses, and as a result, large percentage differences from year to year may not always be statistically significant. In 2012, for instance, property damage in educational properties was estimated to be $64,000,000. This represented an increase of 35 percent from the year before, but was found not to be statistically significant.

In addition to sampling errors, there are nonsampling errors. These include biases of the survey methodology, incomplete or inaccurate reporting of data to the NFPA, or differences in data collection methods by the responding fire departments. As an example of a nonsampling error, most of the fires included in the survey took place in highly populated, residential areas, because the fire departments selected for the surveys are primarily public fire departments that protect sizable residential populations. Fires that occur in sparsely populated areas protected primarily by state and federal departments of forestry are not likely to be included in the survey results.

The NFPA Fire Incident Data Organization database was also used in conjunction with the annual survey to help identify any large loss fires or deaths that the survey might have missed. The editors of the survey data attempted to verify all reported civilian deaths in vehicle fires. They contacted most of the fire departments that reported fire-related deaths in vehicles and found that many of the deaths were indeed the results of fire. In some instances, however, impact was found to have been the cause of death. This effort can have a considerable impact on the estimates.

The results presented in this report are based on fire incidents attended by public fire departments. No adjustments were made for unreported fires and losses (e.g., fires extinguished by the occupant). Also, no adjustments were made for fires attended solely by private fire brigades (e.g., industry and military installations) or for fires extinguished by fixed suppression systems with no fire department response.

Fire Experience of Nonrespondents

A telephone follow-up was made to a sample of nonrespondents to determine whether fire departments that did not respond to the survey experienced fire loss rates similar to those that did respond. This would help the NFPA determine whether we received questionnaires only from departments that had experienced unusually high or low fire losses.

The sample of nonrespondents selected was proportional by state and population of community to the original sample selected for the survey. As a result of these efforts, 155 fire departments were successfully contacted and answered some of the questions about their fire experience.

For communities of 100,000 to 249,999, the rates for respondents and nonrespondents were similar for deaths — the respondent rate was 55 percent higher for civilian deaths, and 102 percent higher for property loss, while the nonrespondent rate was 12 percent higher for fires. The result for property loss was statistically significant.

For communities of 50,000 to 99,999, the respondent rate was 61 percent higher for civilian deaths and 45 percent higher for property loss, while the nonrespondent rate was 18 percent higher for fires. The result for property loss was statistically significant.

For communities of 25,000 to 49,999, the respondent rate was 112 percent higher for civilian deaths and 10 percent higher for property loss, while the nonrespondent rate was 48 percent higher for fires. Results for fires and deaths were statistically significant.

For communities of 10,000 to 24,999, the respondent rate was 20 percent higher for civilian deaths and 11 percent higher for property loss, while the nonrespondent rate was 12 percent higher for fires. None of these results were statistically significant.

For communities of 5,000 to 9,999, the nonrespondent rate was 50 percent higher for fires, while the respondent rate was 21 percent higher for property loss. Neither of these results was statistically significant.

Resources

Several resources are available that provide more detailed documentation on the NFIRS system and using the NFIRS data. The "National Fire Incident Reporting System Complete Reference Guide" provides instructions for reporting data to the NFIRS, as well as an understanding of the data elements collected by the system. It also serves as a reference for the coding of the data.

The "National Fire Incident Reporting System Version 5.0 Fire Data Analysis Guidelines and Issues" discusses analytic considerations and methods of analyzing fire incident data using the NFIRS data. The topics include the NFIRS 5.0 data structure, general quality assurance (QA) issues, and definitions and parameters of common fire analyses (e.g., residential structure fires or fires by a specific cause). The methods, techniques and considerations discussed are those used by USFA analysts and do not necessarily reflect methods, techniques and considerations used by fire data analysts from other agencies and organizations. NFIRS data partners may (and do) employ their own methods for analyzing the data and may make differing assumptions when encountering data issues.

The "National Estimates Approach to U.S. Fire Statistics" is the original methodology for creating estimates of the U.S. fire problem using the NFPA annual survey of fire departments and the NFIRS data. The authors present a detailed consensus procedure for such calculations and the supporting rationale. "National Estimates Methodology for Building Fires and Losses" is the USFA's application of the national estimates approach to building fires and fire losses. It details USFA's current fire data estimation methodology for all building fires (i.e., residential and nonresidential) and associated losses.

The "USFA Data Sources and Methodology Documentation" provides an in-depth discussion of the data sources and the methodologies used to incorporate this data into fire analyses. The "Fire Data Analysis Handbook" is a resource for those unfamiliar with basic data analysis techniques and their applicability to fire data based analyses.

Lastly, NFIRSGrams, short bulletins that provide coding help to fire department personnel using the NFIRS, address frequently asked questions and common mistakes made when completing incident forms. NFIRSGrams also help NFIRS users to better understand their impact on the quality of the information from the NFIRS at the local, state and national levels.

These resources are listed below:

- Hall, J. & Harwood, B. (1989). The national estimates approach to U.S. fire statistics. *Fire Technology, 25(2)*, 99–113. Retrieved from http://www.nfpa.org/~/media/files/news-and-research/fire-statistics/latest-estimates/nationalestimatesapproach.pdf?la=en
- *NFIRSGrams*. Retrieved from https://www.usfa.fema.gov/data/nfirs/support/training.html
- USFA. (2004). *Fire data analysis handbook*, (2nd ed.). Retrieved from https://www.usfa.fema.gov/downloads/pdf/publications/fa-266.pdf
- USFA. (2011). *National fire incident reporting system version 5.0 fire data analysis guidelines and issues.* Retrieved from https://www.usfa.fema.gov/downloads/pdf/nfirs/ nfirs_data_analysis_guidelines_issues.pdf

- USFA. (2012). *National estimates methodology for building fires and losses.* Retrieved from https://www.usfa.fema.gov/downloads/pdf/statistics/national_estimate_ methodology.pdf
- USFA. (2013). *National fire incident reporting system complete reference guide.* Retrieved from http://www.nfirs.fema.gov/documentation/reference/
- USFA. (2014). *USFA data sources and methodology documentation*. Retrieved from https://www.usfa.fema.gov/downloads/pdf/statistics/data_sources_methodology.pdf

Acronyms

AES	Automatic Extinguishing System
CPSC	Consumer Product Safety Commission
CRG	Complete Reference Guide
DEBI	Data Entry Browser Interface
EMS	Emergency Medical Services
FSI	Fire Service Inventory
NASFM	National Association of State Fire Marshals
NFA	National Fire Academy
NFDC	National Fire Data Center
NFIRS	National Fire Incident Reporting System
NFPA	National Fire Protection Association
OMB	Office of Management and Budget
PDR	Public Data Release
PRA	Paperwork Reduction Act
USFA	U.S. Fire Administration